ANCIENT LIFE IN KENTUCKY

WILLIAM SNYDER WEBB
WILLIAM DELBERT FUNKHOUSER

Resources in the Kentucky Geological Survey's catalog, especially older material, may contain content that is harmful or difficult to view. It is our mission to share our primary source documents for their historical and research significance. However, some materials have been found to contain language or imagery that is offensive, dehumanizing, outdated, discriminatory, or culturally or racially insensitive. This content does not reflect the values or modern professional standards at KGS.

For further details on our information policy, please visit uky.edu/KGS/HarmfulContentPolicy.php or to contact us directly with concerns or questions, email kgsmail@uky.edu

Many images in this publication have been redacted, a practice recommended for materials that fall under NAGPRA, the Native American Graves Protection and Repatriation Act of 1990. The captions of the photographs have not been redacted. Since it is generally advised to redact images of human remains and grave goods, and the provenance of many artifacts is unknown (or they are grouped by type without context of their individual origins), KGS has redacted all potentially sensitive images from this publication out of an abundance of caution.

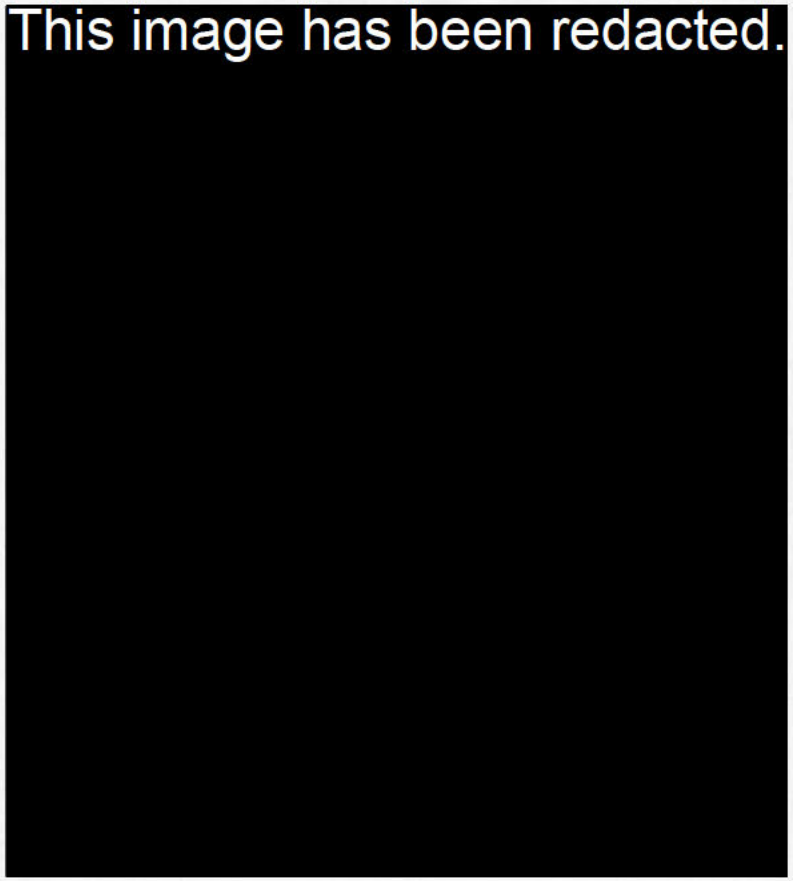
The
Kentucky Geological Survey

WILLARD ROUSE JILLSON
DIRECTOR and STATE GEOLOGIST

SERIES SIX
VOLUME THIRTY-FOUR

Ancient Life In Kentucky

1928



AN EARLY KENTUCKIAN

ANCIENT LIFE IN KENTUCKY

A Brief Presentation of the Paleontological Succession in Kentucky Coupled with a Systematic Outline of the Archaeology of the Commonwealth.

BY

W. D. FUNKHOUSER

PROFESSOR OF ZOOLOGY

University of Kentucky

AND

W. S. WEBB

PROFESSOR OF PHYSICS

University of Kentucky

Illustrated with One Hundred and Seventy-six Original Photographs, Maps and Diagrams.

THE KENTUCKY GEOLOGICAL SURVEY

FRANKFORT, KY.

1928

FIRST EDITION
5000 COPIES

Copyrighted 1928 By
THE KENTUCKY GEOLOGICAL SURVEY
All Rights Reserved

THE STATE JOURNAL COMPANY
Printer to the Commonwealth
Frankfort, Ky.

DEDICATED
TO
PROFESSOR ARTHUR McQUISTON MILLER
whose sound scholarship and kindly
interest furnished the incentive and inspiration for
the work reported in this volume.

Contents

		Page
Letter of Transmission		vii
Illustrations		viii
Contents		vi
Introduction		xvi
Chapter I.	Extent of Prehistoric Life	1
Chapter II.	Animals of the Ancient Sea	5
Chapter III.	Early Land Animals	31
Chapter IV.	Neolithic Man	47
Chapter V.	The Mound Builders	71
Chapter VI.	The Cave Dwellers	123
Chapter VII.	The Cliff Dwellers	143
Chapter VIII.	The River People	153
Chapter IX.	The Stone-Grave People	163
Chapter X.	The Use of Bone, Shell and Horn	177
Chapter XI.	Chipped Stone Artifacts	205
Chapter XII.	Ground Stone Artifacts	233
Chapter XIII.	Pottery	269
Chapter XIV.	Miscellaneous Artifacts	287
Chapter XV.	Pre-columbian Times	299
Chapter XVI.	Archaeological Survey	309
Bibliography		335

Letter of Transmission

Dr. W. R. Jillson, Director
Kentucky Geological Survey,
Frankfort, Kentucky.

Dear Sir:

We beg to transmit herewith illustrated manuscript report on, "Ancient Life in Kentucky," as requested and outlined by you.

This report attempts to survey briefly the prehistoric life of that part of the Mississippi Valley which is now this Commonwealth and to present a statement of the research completed to date on Kentucky archaeology.

The authors are together responsible for the study since collaboration was carried out in all parts of the report.

Respectfully submitted,

W. D. FUNKHOUSER,
W. S. WEBB.

University of Kentucky
Lexington, Ky., July 1, 1927.

List of Illustrations

1. Frontispiece. *An Early Kentuckian* ii
2. Diagrammatic east-west cross-section of Kentucky 9
3. A sponge with a bud 11
4. Longitudinal section of sponge 11
5. Sponge spicules 12
6. A piece of coral 13
7. A fossil crinoid 13
8. Bugula Avicularia 14
9. Eridotrypa briareus 15
10. A platystrophia 16
11. The mussel 17
12. Inside of mussel shell 18
13. The snail 18
14. The slug 19
15. Modern gastropod shells 19
16. The squid 20
17. The octopus 21
18. The pearly nautilus 22
19. A trilobite from Kentucky 24
20. An Ancient coral reef 26
21. Stegocephalin amphibians of the lower permian 31
22. Ancient cockroaches 32
23. The beginning of land life 33
24. The salamander 34
25. Rhamphorhynchus phyllurus 35
26. A giant reptile 36
27. A former ruler of the earth 36
28. Stegosaurus 37
29. The lizard 39
30. Megatherium 41
31. The mammoth 45
32. The mastodon 46
33. "Good Indian Country" 54
34. A neolithic man 60
35. A victim of progress 73
36. A ceremonial mound 75
37. An ancient hearth 76
38. A shelter-roof mound 81
39. Shelter-roof mound 82
40. A burial mound 85
41. Prehistoric skeletons 86
42. A flexed burial 87
43. A headless skeleton 88
44. Man with shell head-dress 88
45. Man with crushed skull 89
46. Surface chart of clay mound 90
47. The perrant mound 92
48. A double burial 93
49. A grave by the river 95
50. Four types of skulls 96
51. Pierced by an arrow 96

52. A twisted face 97
53. A deformed head 98
54. Prehistoric surgery 100
55. Maltese cross decorations 104
56. Fullerton field 108
57. The completely flexed type 110
58. The partly flexed type 111
59. The fully extended type 112
60. Wolf jaws 114
61. A gruesome decoration 115
62. A hasty burial 116
63. A bear-skull gorget 117
64. In a Kentucky cave 124
65. A "sink hole" 125
66. The home of the cave dweller 126
67. Entrance to Hines cave 129
68. A camp at Hines cave 130
69. Old man from Hines cave 132
70. Gnawed by wild beasts 135
71. Entrance to Phelps cave 135
72. Breck Smith cave 136
73. The home of the cliff dweller 142
74. The past and the present 146
75. Cliff Dweller Country 151
76. Camping on Green river 156
77. Trenching a shell mound 157
78. In the land of the river people 160
79. Typical stone graves 165
80. Old woman with one tooth 166
81. The tallest of the stone-grave people 169
82. A stone grave near Carlisle 170
83. Bone awls 180
84. Bone awls 181
85. Bone awls 182
86. Bone awls 183
87. Celts 184
88. Bone flakers 185
89. Arrowpoints and spearpoints 187
90. Shell and bone utensils 188
91. Bone beads 190
92. Shell beads 191
93. Shell beads 192
94. Teeth and shell ornaments 193
95. Shell decorations 194
96. Shell pendants 194
97. Pendants and disks 195
98. Gorgets 196
99. Gorget and beads 197
100. Mask gorget 198
101. Mask designs 199
102. Shell gorgets 200
103. Animal teeth pendants 201
104. Curious necklaces 202
105. Imitation teeth 204
106. Methods of chipping flint 206

107. An aboriginal quarry workshop 209
108. Quarry blanks and arrowpoints 210
109. Chipping flint 211
110. Flint knives 212
111. Spearpoints 213
112. Arrowpoints 214
113. Arrowpoints 215
114. Arrowpoints 216
115. Serrated arrowpoints 218
116. The so-called "bird arrows" 219
117. Drilled artifacts 220
118. Methods of using drills 221
119. Flint drills 222
120. Notched drills 223
121. Curious shapes 223
122. Flint celts 224
123. Flint scrapers 225
124. Flint hoes 226
125. Flint hoes 227
126. Limestone hoes 228
127. Hammerstones 229
128. Stone disks 231
129. The first step in grinding 233
130. Full-grooved axes 235
131. Partly grooved axes 236
132. Curious axes 237
133. Celts 238
134. Stone celts 239
135. Chisels 240
136. War clubs and play balls 241
137. Pestles 243
138. Lap stones 245
139. Net sinkers and cones 247
140. Tubular pipes 249
141. Bird pipe 250
142. Animal pipe 251
143. Interesting fashions in pipes 252
144. Double conoidal pipes 253
145. Ovoid and elbow pipes 254
146. Totem pipes 254
147. Totem pipes 255
148. Face pipes 255
149. Unfinished pipes 256
150. Siouxian pipes 257
151. Discpodals 258
152. Game stones 259
153. Decorated game stones 261
154. Slate gorgets 261
155. Ear ornaments 263
156. Bar gorgets 263
157. Banner stones 264
158. Plummets 266
159. Pot handles 274
160. Shards 275
161. Bowls 276
162. Rim shards 276

163. Water bottles 277
164. Unique pottery pieces 278
165. Mortuary vessels 278
166. Pots 279
167. A first national bank 280
168. Miscellaneous pottery articles 282
169. Zoomorphic pottery 283
170. Duck bowl 284
171. Spatulate forms 293
172. Miscellaneous and pictograph forms 294
173. An ancient slipper 296
174. Whet stones 297
175. William J. Curtis 308
176. A fine Indian knife 27

Ancient Life in Kentucky

ANCIENT LIFE IN KENTUCKY

INTRODUCTION

The State of Kentucky is extremely rich in paleontological and archaeological material and has furnished many of the most valued of the specimens which are on display in the great museums both of the United States and of Europe.

There are several reasons why Kentucky is able to present this wealth of material. In the first place, the State as a whole was not disturbed by glacial erosion and in general the superficial strata have suffered little change since preglacial times. Again, the State is extremely rich in caves, some of them of enormous size, and these caves from time immemorial have been the homes of animals and of man whose remains, covered with deposits of soil and rock, have been but slightly disturbed if at all. Moreover, many of the caves are of the so-called "saltpeter" type and this chemical seems to be a natural preservative of organic material. But most important of all, the caves are often filled with stalagmitic formations which, if they happen to enclose an ancient skeleton or other prehistoric object, preserve it in a most efficient fashion.

It seems, in fact, not unreasonable to suppose that if evidences of ancient man, comparable to the famous types which have been discovered in the caves of France and Belgium, are to be found in the Western Hemisphere they should be found in Kentucky where so many similar conditions obtain—the distance from the glacial drift, the climate, the approximate latitude and the abundance of limestone caves with southern exposures. Indeed, Kentucky is unusually well supplied with evidences of early human occupation. Mounds, fortifications, graves, rockhouses and ceremonial structures are abundant in practically all parts of the State.

Yet, except in the field of Geology, there has been made almost no attempt to uncover the valuable accumulations which might add so much to the knowledge of various departments of science. Geologists for many years have collected fossils in Kentucky, some of the species represented being unque and many of the formations being of unusual interest.

In the field of Paleontology, Big Bone Lick has supplied the world with Pleistocene mammal material. As early as 1795 General William Henry Harrison made a collection of such material, including a four-horse wagon load of mastodon teeth alone. Later, about 1800, Dr. Samuel Goforth of Cincinnati made an even greater collection which was eventually secured by the College of Surgeons in London. In 1805 President Thomas Jefferson secured another large collection in Kentucky, part of which went to the Philadelphia Academy of Science and part to the Paris museum.

Of equal importance are the Indian relics which have been found in this State. Choice artifacts with Kentucky labels are to be found in museums throughout the world and particular specimens from such regions as the famous "Fox Fields" and "Indian Knoll" are nationally known.

It is most unfortunate, however, that practically all of this valuable material has been taken from the State, and Kentucky, after having supplied the world, has no great public collection within her own borders. It is believed that the apparent lack of interest in these subjects has been due largely to the fact that few persons have had their attention called to the possibilities offered in investigation and study along these lines. The study of this ancient life affords a fascinating field but little research work has been done in this State on some of the most interesting of the problems.

The object of this brief report, therefore, is to record some of the information already secured and to stimulate if possible further work in paleontology and archaeology in Kentucky.

This report is written for the layman. Technical terms have been avoided and an endeavor has been made to tell something of the Ancient Life of Kentucky in as simple and concise a fashion as possible with no attempt to introduce original ideas or philosophical discussions.

CHAPTER I

EXTENT OF PREHISTORIC LIFE

Ancient life in Kentucky began in the sea many millions of years ago. Until about the beginning of the Upper Carboniferous Period, which geologists estimate as being over seventeen millions of years ago, that part of North America (the old continent *Laurentia*) which is now Kentucky was the bottom of an ancient ocean in which swarmed myriads of animals—crinoids, corals, bryozoans, brachiopods and molluscs—the fossil shells of which can now be found in the rocks or on the surface of the ground in practically all parts of the State.

Later, higher forms of marine life gradually appeared in these ancient waters. Curious armored fishes, primitive sharks and giant bony fishes—each in their turn were rulers of the deep. All this we know from the record of the rocks.

At that time, also, there was apparently a struggle going on between the animals of the North and those of the South for the supremacy of these waters, for this part of the American continent was invaded by the sea from two directions, from the north by an extension of Hudson Bay and from the south by the Gulf of Mexico so that the waters of these two great seas intermingled and caused an overlapping of the northern and southern marine forms. In this conflict the southern forms became dominant for the northern waters slowly receded, due to uplift, while for ten or twelve million years more the Gulf of Mexico extended up into Kentucky. Southern marine waters then covered all of that region west of the present Tennessee River, now known as the "Purchase Region," so that even today this western district is quite distinct from the rest of the State in its geology, its fauna and its flora.

As time went on, the land began to appear above the water, at first with many alternate elevations and depressions. Parts of the ocean floor would be lifted up only to be submerged again as the position of the sedimentary masses shifted in their many foldings and faultings. This also is part of the story told us by the rocks.

At last, however, probably during the Mississippian Period, the waters receded for the last time and left much of Kentucky a permanent land mass. Then other forms of life appeared, the early types of amphibians—heavy-bodied newts and salamanders, and later frogs and toads—but of these animals we have almost no records, for practically no evidences of their distribution in Kentucky has yet been discovered. During this period, however (the Carboniferous or Age of Amphibians) the immense coal measures of the State were formed by the fossilization of the great masses of plant life which had by that time developed.

Following the Carboniferous Age there is a great gap in the known history of the ancient life of this State. We have practically no record of conditions in this part of the Mississippi Valley during the eight or ten millions of years of the Mesozoic Era. We know that in other parts of the United States the land animals appeared in rapid succession—the ancient reptiles, the toothed birds, the early mammals—all are known from the Connecticut Valley to the Western Plains and they were probably equally abundant in Kentucky but there are few Mesozoic formations in this State and these pages from the book of Nature are therefore missing.

But the story begins again in the Pleistocene Age and at once the pages are filled with abundant and fascinating facts. During the first part of this age (the Glacial Period) the great ice-sheets moved down from the north driving all life before them, but these enormous ice masses disturbed Kentucky very little. As they approached this State a milder climate arrested their progress with the result that only restricted areas were glaciated south of what is now the Ohio River. From the fringe of the glaciers southward through the State the prehistoric beasts of that period struggled for existence. Mammoths, mastodons, peccaries, tapirs, primitive horses and prehistoric elk roamed the forests, fields and cane-brakes and fought for possession of fords, springs, and salt-licks. Their bones may be dug up by the tons from the marshes and swamps around salt-licks where the animals perished and where their bones were trampled into the soft soil. Ancient bears and other carnivores

pursued and preyed upon the herbivorous forms. Kentucky teemed with life. All this story is told by the bones.

Toward the close of the Glacial period, primitive man appeared upon the scene—the first Kentuckian. Where he came from, we do not know. Possibly over the old land bridge from Siberia; perhaps from Europe by an eastern route; possibly even from the south where the Incas and Aztecs are known to have had very ancient habitations. As to what he looked like and what he did, however, we are better informed, for the crumbling human skeletons and evidences of early human occupation give us some clews as to his appearance and his ways of living. He was a man of the Stone Age; he was doubtless a barbarian and a savage; but he was the culmination of the Ancient Life of Kentucky.

CHAPTER II

ANIMALS OF THE ANCIENT SEA

Scientists are constantly pushing back the age of the earth. Each new discovery seems to indicate that our planet is far older than it was formerly thought to be, and that life has been upon it for a much greater period than was formerly supposed.

The table on two following pages estimates in very conservative figures the approximate length in years of the various geological eras with their subdivisions, as estimated by present day geologists.

Such an estimate would mean that our earth is over seven hundred million years old; that there has been life upon the earth for over two hundred million years; and that man himself has been on earth for over four hundred thousand years, since it is now definitely known that man dates back at least to Pleistocene times. In the Western United States in Oklahoma and New Mexico, his rude stone implements have been found associated with Pleistocene mammalian fossils.

Moreover, life developed on the earth very slowly and gradually. At first, during the Archeozoic Era, only the simplest marine protozoans were present; more than a hundred million years elapsed before we see signs of the simple sponges and coelenterates, and nearly another hundred million before we begin to find the fossils of trilobites, brachiopods, molluscs and crustaceans. Then slowly through the ages were evolved higher and higher forms—corals, jellyfish, insects, fishes, reptiles, birds and mammals, and at last primitive man—each in turn appeared upon the scene.

According to the geology of Kentucky, the most of this State was under water until a little before the Pennsylvanian Age, which is theoretically placed at approximately seventeen million years ago. Consequently any life on this part of the earth before that time must have been marine life, and just what that life was may be judged from the fossils in the rocks which were laid down in these ancient waters.

The surface rocks of Kentucky are almost entirely sedimentary in structure, that is, they were formed by the sediment

Era	Period		Theoretical Duration in Years	Designation
Psychozoic (Era of Man)	Present		Roman times to present	Age of steel
	Modern		50 B. C. to Roman times	Later iron age
	Recent (Prehistoric man)		1500—500 B. C.	Earlier iron age
			4000—1500 B. C.	Bronze age
			7000—4000 B. C.	Neolithic (New stone age)
			40,000—7000 B. C.	Paleolithic (Old stone age)
			100,000—40,000 B. C.	Eolithic
Cenozoic	Quaternary	Holocene	100,000 years	Era of Mammals
		Pleistocene	200,000 years	
	Tertiary	Pliocene	3 million years	
		Miocene		
		Oligocene		
		Eocene		
		Paleocene		
Mesozoic	Cretaceous		9 million years	Era of Reptiles
	Comanchian			
	Jurassic			
	Triassic			
Paleozoic	Carboniferous	Permian	18 million years	Age of Amphibians
		Pennsylvanian		
		Mississippian		Age of Fishes
	Devonian			
	Silurian			Age of Invertebrates
	Ordovician			
	Cambrian			
Proterozoic	Keweenawan		50 million years	Lower Invertebrates
	Animikean			
	Huronian			

Archaeozoic	Algoman	150 million years	First Invertebrates
	Timiskamian		
	Laurentian		
	Logonian		
Azoic	Crust formation	200 million years	No life
Red star evolution		27 million years	
Yellow star evolution		125 million years	
White star evolution		135 million years	
Nebulae		?	

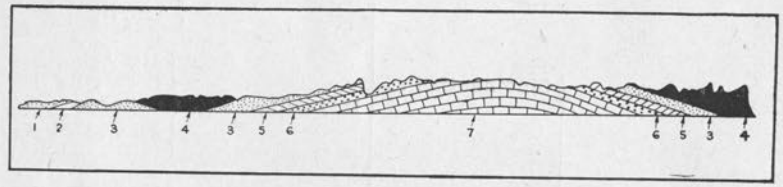
which settled to the bottom of the sea and later became hardened to form rock. Such sediment is always deposited in layers or strata and the resulting formations are therefore spoken of as stratified rock. These rocks are chiefly limestones, formed principally of carbonate of lime; sandstones, formed of sand grains cemented together; and shales and slates, formed chiefly from clay. Since we know that any part of the earth's surface showing stratified rock must have at one time been under water, and since a series of strata means that it must have been under water several times or under different conditions, it is obvious that Kentucky was not only the bed of an ocean or lagoon for long ages, but that it probably was subjected to many elevations and depressions, for the strata are numerous and varied.

When an aquatic animal dies, its body, or its bones, or its shell sinks to the bottom and becomes covered with the constantly accumulating sediment, thus leaving a record of its existence in the rock which is formed from this sediment. Any evidence of a living form of a previous geological age is called a fossil and there are three common types. Sometimes parts of the body itself, particularly the hard parts such as the bones, teeth or shell, remain intact, still composed of their original matter preserved without change. Sometimes the original organic matter is slowly replaced by mineral matter and we then speak of it as petrified; occasionally this replacement is so perfect that we can actually see the microscopical cell structure as in petrified wood. Sometimes the entire organism slowly decays leaving only its imprint in the rock which gives us a cast of the original form; these casts may also be very distinct, even of such delicate structures as the wing of an insect or the leaf of a plant.

Paleontologists recognize the fact that it is much more likely for an aquatic form to become a fossil than it is for a land form, for the bodies of land animals seldom find their way to the sedimentary bottom of a lake or ocean. It is not surprising, therefore, that our rocks should be so rich in marine life and so barren of evidence of land animals. In fact our principal mammalian fossils are of animals which have drowned in marshy bogs or whose bones have been trodden into the soft mire about salt licks.

When Kentucky was elevated from the shallow sea which had covered it for millions of years its first form was that of an island. This was due to the domal structure of what is now the Bluegrass region. Gradually the top of this dome was worn off, exposing the edges of the underlying strata as shown in the accompanying figure which represents a cross section of the State from east to west.

DIAGRAMMATIC EAST-WEST CROSS-SECTION OF KENTUCKY



KEY

1. Tertiary
2. Cretaceous
3. Mississippian
4. Pennsylvanian
5. Devonian
6. Silurian
7. Ordovician

It will be seen upon following the rock formations as roughly indicated in this figure, that the oldest rock exposed in the State is the Ordovician limestone in the Blue Grass region. On both the east and the west sides of this formation we come successively to the Silurian, Devonian, Mississippian and Pennsylvanian. Each of these in order, except the Pennsylvanian, once extended over the top of the now broadly exposed Ordovician. The Coal Measures now represented by the eastern and the western fields at opposite sides of the State were probably connected across Pulaski, Casey, Taylor, Hart and adjacent counties of central southern Kentucky.

Therefore in various sections of Kentucky, various formations outcrop, so that it is possible to examine the fossils in each and determine the kinds of animals which inhabited the waters just before that type of rock was formed. In this way we secure an accurate knowledge of the ancient marine life.

Since the oldest fossil-bearing rock exposed in Kentucky is the Ordovician, it follows that our record of the ancient marine

life in this State must begin with the forms shown in this formation. The great Ordovician System, however, is extensive and covered a long period of time so that it is usually subdivided into series, stages and substages which are represented in Kentucky as follows:

System	Series	Stage	Substage
Ordovician	Cincinnatian	Richmond	Saluda
			Waynesville
			Arnheim
			Liberty
		Maysville	Mt. Auburn
			Corryville
			Bellevue
			Fairmount
			Mt. Hope
		Eden	Garrard
			Million
			Fulton
	Champlainian	Cynthiana	Pt. Pleasant
			Greendale
		Trenton	Perryville
			Bigby
			Jessamine
			Hermitage
			Curdsville
		Highbridge	Tyrone
			Oregon
			Camp Nelson

Of course those layers of rock which are lowest in the series and ordinarily buried the deepest contain the oldest fossils, while the more recent layers show the remains of later forms of life.

The deepest natural cut in the Ordovician rocks in Kentucky, as the foregoing table would indicate, is that made by the Kentucky River near Camp Nelson. Here at low water may be seen the oldest exposed Ordovician strata in the State.

The Ordovician rocks as a whole are rich in fossils and each stage and substage has its characteristic forms by which that particular formation may be recognized. Such fossils are sometimes called "index fossils" since they serve to identify the rocks. The characteristic fossils of the Ordovician include

sponges, corals, crinoids, bryozoans, brachiopods, pelecypods, cephalopods, gastropods, and trilobites, and a brief description of each of these forms will give us an idea of the kind of animals which lived in the waters of this part of the earth twenty or thirty millions of years ago.

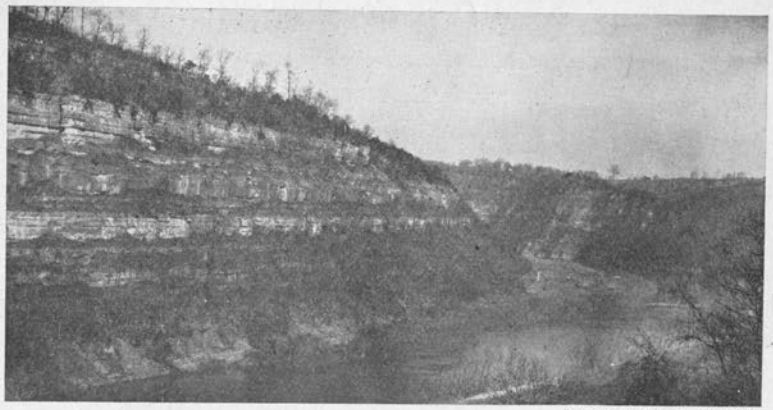


PHOTO BY W. R. JILLSON

FIG. 2. A NATURAL CUT.
Deep gorge in Kentucky River.

The *sponges* are the lowest of the metazoans, or animals which have more than one cell, and are very simple in structure. The body is hollow, with an opening at the top; the body wall

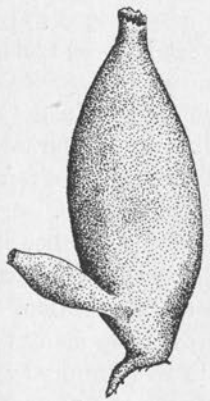


FIG. 3.
A SPONGE WITH A BUD.
A primitive marine animal.

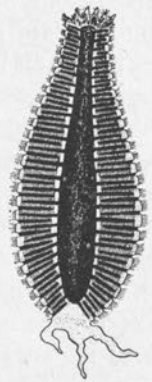


FIG. 4. LONGITUDINAL SECTION OF SPONGE.
Showing the hollow body and the canals.

contains numerous spicules of lime or of silicate and is permeated by many pores through which water enters the body cavity. Sponges reproduce chiefly by simple processes such as budding or fission and are very primitive. They are mostly marine and somewhat plantlike in appearance.

The ancient sponges were not unlike the modern forms in general appearance and since their spicules consisted of mineral matter the structures are often well preserved.

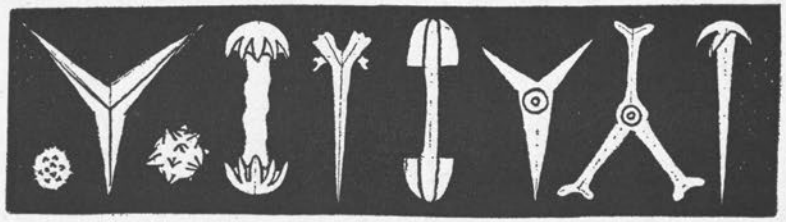


FIG. 5. SPONGE SPICULES.
Curious designs in skeletal fibers.

The *corals* belong to the phylum of animals, most of which are marine, which includes also our modern jellyfishes, hydroids, polyps, sea-anemones and hydras, but the corals are characterized by the fact that they secrete in their body walls a large amount of lime so that after the death of the individual the skeleton persists as a stony mass. New generations grow upon the remains of the old and as a result great islands, reefs, atolls and barriers are often built up by the continued deposits. Sometimes the mineral matter is brilliantly colored as in the case of our precious corals, and often the growth takes remarkable and fantastic forms, producing the interesting tree-corals, fan-corals, head-corals, rose-corals, cup-corals, and brain-corals.

Since the body wall of this animal contains so much mineral matter, there is little to decay and the form is easily preserved. As a result, corals lend themselves well to fossilization. Moreover, since corals are so abundant and grow in so many types of habitats, from the surface of the water to five hundred fathoms below the surface, fossils of this class of animals are extremely common and may be found, not only in the Ordovician, but in practically all of our Kentucky rocks. Apparently the ancient

corals were very similar to those of today for in many cases the fossils are almost identical with certain modern forms.

FIG. 6. A PIECE OF CORAL.
Showing tree-like habit of growth.

The *crinoids* or "sea-lilies" are marine animals which are very plant-like in appearance, usually consisting of a long slender stalk at the top of which is the body or "calyx" from which radiate a whorl of branched, feathery tentacles or "arms." The entire animal is thus extremely flower-like. There are only about five or six hundred species of this class of ani-

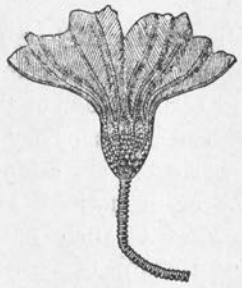


FIG. 7. A FOSSIL CRINOID.
Popularly known as the "sea-lilly."

mals now on earth but they were apparently very abundant in ancient times for their fossil remains are common in most limestone formations. They belong to the same great group of ani-

mals as the star-fish, brittle-star, sea-urchin, sand-dollar and sea-cucumber, and closely resemble the other members of the group in their physiology and life history. They live in both deep and shallow water and the body is firm enough to leave excellent impressions in the rock. Very beautiful and perfect specimens of crinoids may be found in the Ordovician limestones of Kentucky.

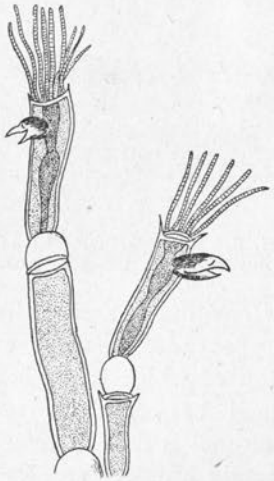


FIG. 8. BUGULA AVICULARIA.
A modern bryozoan.

The *bryozoans* or "moss-animals" also suggest plant structures in their appearance. They are colonial aquatic animals usually found growing in tufts an inch or two in height on rocks or drift-wood along the ocean shores. They are very abundant in almost all parts of the world but are seldom noticed because of their modest appearance or, if noticed, are supposed by most persons to be plants. Most of them are marine, ranging in habitat from tide-level to a depth of over fifteen thousand feet, but a few inhabit fresh water. The colony is made up of a bunch of tiny stems, each stem bearing a series of little heads or cups suggesting the blossom of a flower. In the center of the cup is the mouth, which is surrounded by a crown of ciliated tentacles. The animals are attached to the rocks or drift by means of root-like fibers. On the cups are peculiar appendages, the avicularlae,

which resemble the head of a bird with little beaks which are always in motion and probably protect the animal from attacks of small organisms which might settle upon it. Bryozoans are very simple animals. The digestive system is primitive, there are no blood-vessels nor excretory organs, breathing is accomplished through the tentacles, and no nervous system has been found.

Like the crinoids, the bryozoans must have been very numerous in the former geologic ages for we find their fossils from the lower Ordovician to the present. The fossil figured is a specimen from the Cynthiana formation in Kentucky.

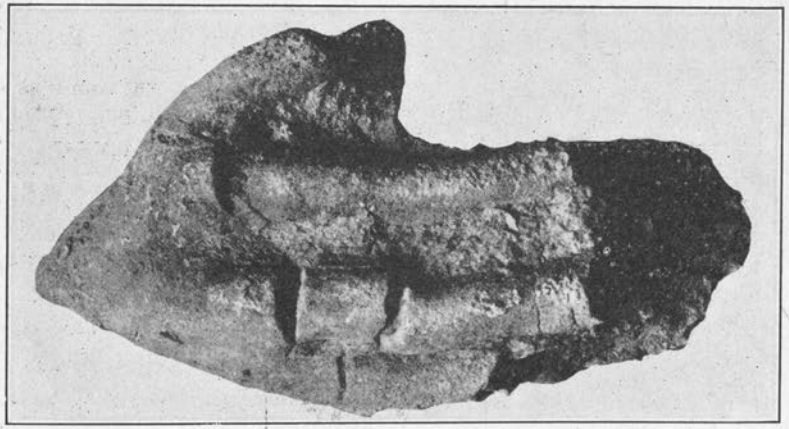


FIG. 9. ERIDOTRYPA BRIAREUS.
A fossil bryozoan from Kentucky.

The *brachiopods* belong to the same phylum of animals as the bryozoans but in appearance they more nearly resemble certain of the bivalve molluscs since they have a pair of hard calcareous shells. In fact, for a long time zoologists regarded them as molluscs because of this resemblance. In the brachiopods, however, the shells are dorso-ventral instead of lateral as in the molluscs and they are not symmetrical. One valve is larger and shows a beak while the other is smaller and usually does not agree with its mate in convexity. The large beaked valve is called the pedicle valve and the other the brachial valve. It is this peculiar appearance of the valves which gives the very characteristic imprint or cast in many of our fossils.

Present-day brachiopods, which are very abundant, are all marine and are found in almost all parts of the world. Most species live in shallow water but some are found at very great depths. It is noticeable that the shallow-water forms are more numerous and have much thicker shells than the deep-sea varieties and this fact gives us a clew as to the depths of different parts of the seas in ancient times, since we may judge the type of habitat by the abundance of the fossils and the thickness of their valves. Brachiopods are usually attached to some object by a stalk or peduncle and inside the shell is a curious organ, the lophophore, which bears two arms, each arm provided with tentacles for securing food. Although primitive and simple animals they have well developed digestive, circulatory and nervous systems.

The brachiopods are an extremely old race and seem to have changed but little through the ages. In fact, one form, *Lingula,* which is on earth now, is apparently the same as it was in the Silurian some twenty-five million years ago. Fossil brachiopods are abundant in Kentucky and a number of species are represented. The specimen figured is from the Arnheim beds of the Ordovician.

FIG. 10. A PLATYSTROPHIA.
One of the common fossil brachiopods of Kentucky.

The *pelecypods* are mulluscs which are distinguished by having a thin hatchet-shaped foot and usually possessing a pair of symmetrical lateral shells. Our present-day clams, mussels, oysters and scallops belong to this class. The inside of each shell shows the scars of the powerful muscles which hold the valves together, the teeth which interlock when the valves are closed to prevent opening by twisting, and often a deposit of beautiful iridescent nacre or "mother-of-pearl," which in many of the

marine forms is extremely attractive. The body of a pelecypod is soft and ends in the muscular foot which is used in locomotion. On each side of the body is a pair of gills by means of which the animal breathes, and between the gills and the valves, a thin mantle which secretes the lime of which the shell is composed.

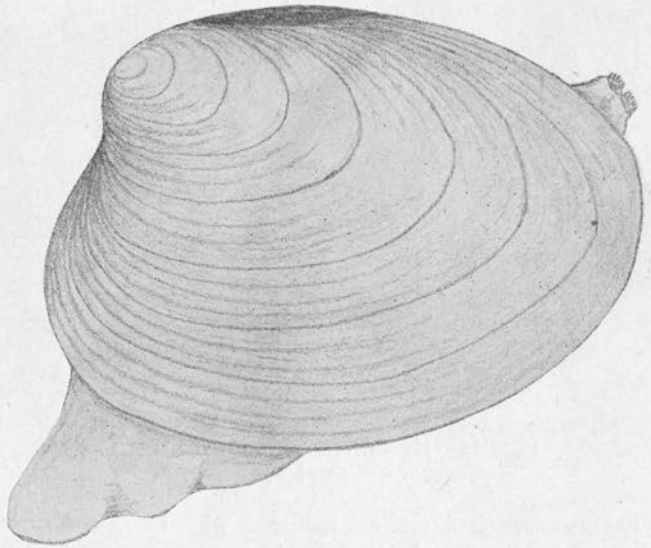


FIG. 11. THE MUSSEL.
A modern pelecypod.

At the posterior end of the body the mantles form two siphons, the inhalent siphon through which the water is brought in, and the exhalent, through which it is discharged. The pelecypods have complete and rather elaborate digestive, circulatory, respiratory and reproductive systems.

Most pelecypods burrow in the mud or sand and are found in comparatively shallow water. Some species are parasitic in their larval stages, living in the bodies of fish or other aquatic animals. Many species secrete pearls and are much in demand for this reason.

Because of their characteristic shape and the equal, symmetrical, compressed, "mirror-image" valves, pelecypods are usually easily recognized, whether modern or ancient. Moreover, since the shells are composed entirely of mineral matter,

they lend themselves well to fossilization and therefore their shells, casts and imprints are common as fossils. Many of the Ordovician pelecypod fossils are very well preserved and very suggestive of modern forms.

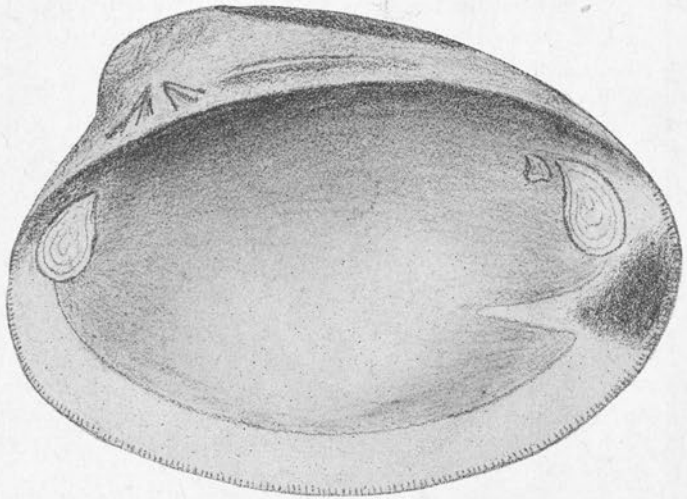


FIG. 12. INSIDE OF MUSSELL SHELL.
Showing teeth and muscle-scars.

The *gastropods* are those molluscs which are not symmetrical, have a distinct head, have the foot on the abdominal part of the body and usually have a univalvular spiral shell. Belonging to this class of animals are our modern snails, which have the typical spiral shell and the slug, in which the shell is vestigial. Gastropods are very abundant at the present time and are

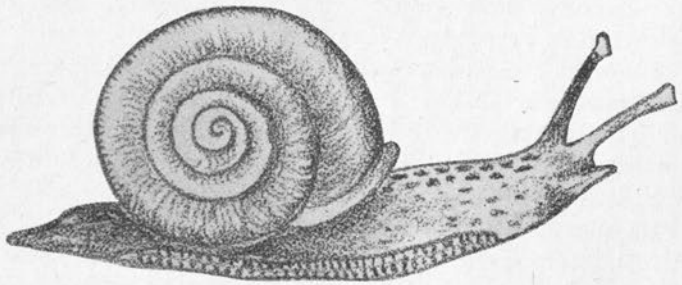


FIG. 13. THE SNAIL.
A modern land gastropod.

found in almost all parts of the world and in a great variety of habitats. Some are marine, some live in fresh water, and some are terrestrial. Some are found beneath the surface of the earth and some in the tops of trees. Some live in marshes; others in the desert. Along the sea-shore and around ponds and

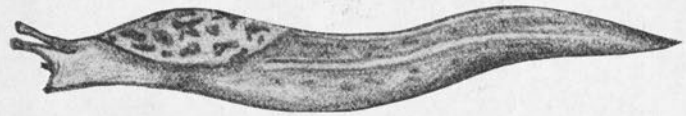


FIG. 14. THE SLUG.
A modern gastropod without a well developed shell.

streams their shells may be found in vast numbers and may usually be recognized by the typical spiral shape although some are saucer-shaped or almost flat. Sometimes these shells coil toward the right (dextral) and sometimes toward the left (sinistral).

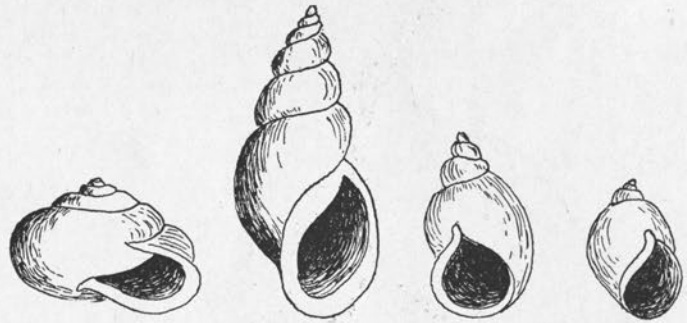


FIG. 15. MODERN GASTROPOD SHELLS.
Showing dextral and sinestral types.

The body of a gastropod is soft and is asymmetrical, due to the torsion in growth. In the more typical modern forms, such as the snail, the animal has a distinct head on which is a pair of tentacles and a pair of eyes on stalks which can be raised or lowered. Like other molluscs, the snail has a mantle which secretes the shell. The digestive system is well developed and consists of a mouth, oesophagus, salivary glands, stomach, intestine and anus. The food is usually vegetable matter which is scraped up with a peculiar rasp-like tongue. The snail has a

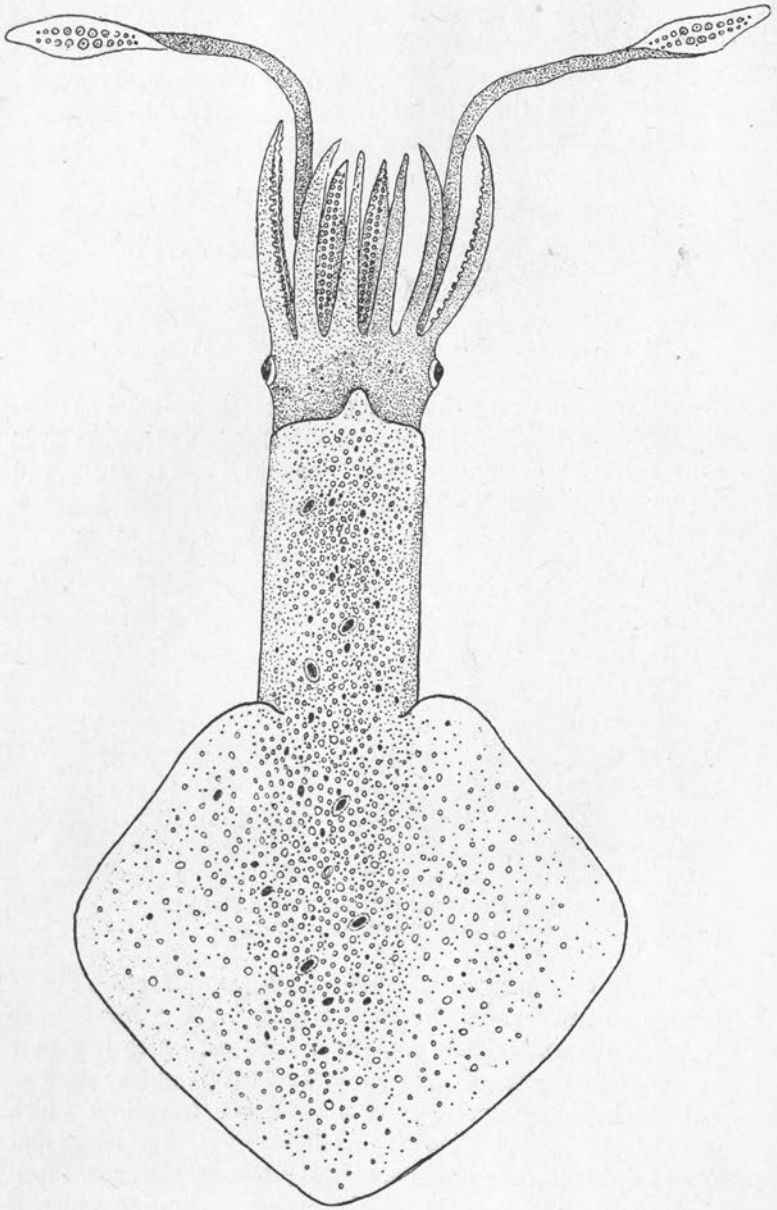


FIG. 16. THE SQUID.
A modern cephalopod.

heart with one auricle and one ventricle and colorless blood with a definite circulation. It breathes through a single gill. The nervous system consists of a series of well developed ganglia and some of the special senses seem distinct. Sometimes the sexes are separate and sometimes the animals are hermaphroditic. Of course these soft body parts are not often preserved as fossils and usually only the shells or their casts are represented in the fossil forms.

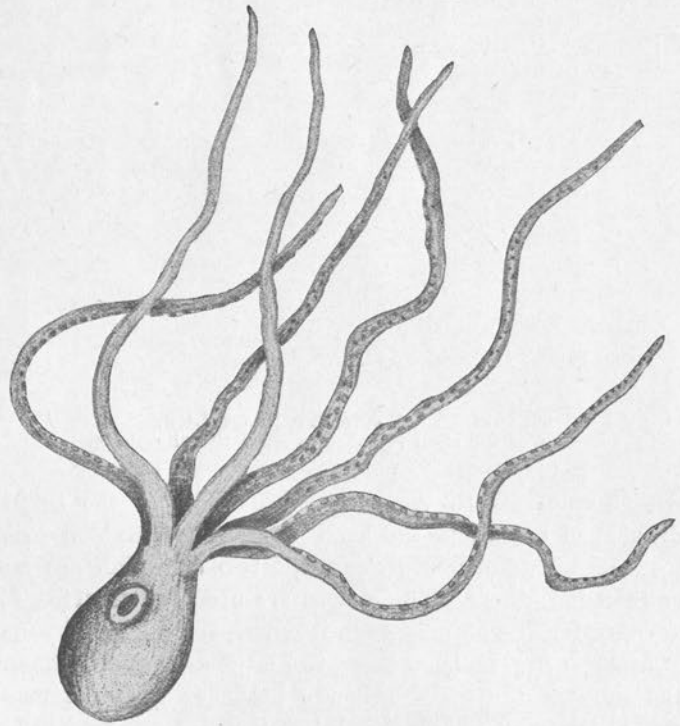


FIG. 17. THE OCTOPUS.
The largest living cephalopod.

The *cephalopods* are also molluscs in which the foot is developed from the head and is divided into tentacles with suckers. The shell is often poorly developed and sometimes entirely absent. The cephalopods are bilaterally symmetrical and the head is distinct. They are all marine. The general anatomy and physiology is homologous with that of the other molluscs

but the shape of the body and the habits of the animals are quite different.

Modern cephalopods are best known from our common squid, which is found in most of the oceans of the world and which is represented by the species *Loligo pealii* along the

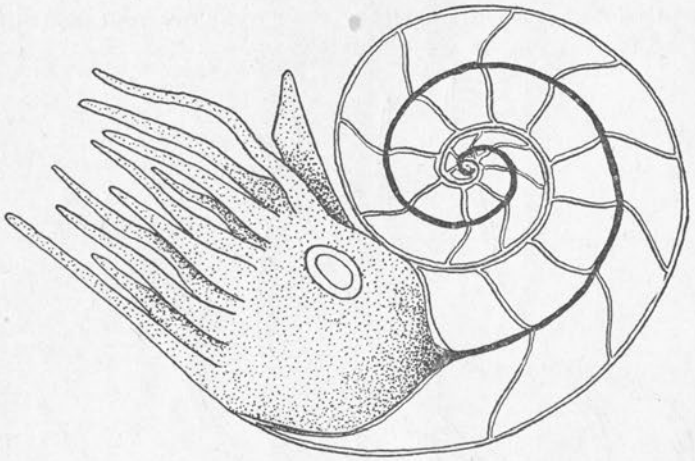


FIG. 18. THE PEARLY NAUTILUS.
One-half of the shell removed to show the chambers.

eastern coast of North America. The body of the squid is spindle-shaped and from the head projects the divided foot in the form of ten tentacles or "arms," two of which are much longer than the others. These arms are used for securing food and for steering the animal when it swims, for the squid usually swims backward. The head bears two large eyes and the mouth. On the sides of the body near the posterior end, the mantle projects in triangular flaps called "fins" which are used in locomotion. The skin is leathery and has the power of changing color. In the dorsal part of the body just beneath the skin is the remains of the shell which is known as the "pen." The body contains an "ink-bag" in which is secreted a black fluid which the animal discharges when disturbed.

The largest of modern cephalopods, and in fact the largest living invertebrates, are the octopods which are really dangerous and powerful animals. The octopus or "dveil-fish" of the

tropical seas reaches a length of ten or twelve feet and a weight of nearly one hundred pounds. These giants among the molluscs have been known to destroy the unlucky bather who comes within their reach and the strength of their writhing arms with their powerful suckers has been made the theme of many an exciting tale of the sea.

Belonging to this same class is the famous pearly nautilus or "chambered nautilus" of the tropical waters, made classical by Oliver Wendell Holmes' poem. This animal builds a shell which consists of a series of chambers separated from each other by partition walls or "septa." The nautilus lives in the outer chamber but maintains connection with the old chambers by means of an extension of the body called the "siphon," the function of which is not entirely understood. As the animal increases in size it builds new chambers, continuing the curvature and structure of the shell. This habit has given the poet the theme:

"Build thee more stately mansions, O my soul,"

which is familiar to every school boy and girl.

Most of the fossil cephalopods are of the squid or nautilus type. They are very abundant and range through a long geologic series.

The *trilobites* are closely related to the crustaceans and in fact are included by most zoologists in that class of animals. Our modern crustaceans include such forms as the crayfish, lobster, crabs, barnacles and shrimps. Trilobites are entirely extinct and we know them only from fossils. These fossils, however, are so abundant and in many cases so perfect, that we know well what the animal was like.

The exoskeleton of the body consisted of a heavy dorsal shield which is the part best preserved in the fossils; a thin ventral membrane which is only occasionally evidenced; and the coverings of the appendages. The dorsal shield shows a head with a central disc called the glabella, two cheek or eye lobes, and a pair of antennae; a thorax consisting of many segments; and a single caudal plate, the pygidium. On the under side of the body were legs and on the under side of the head a series of mouth parts.

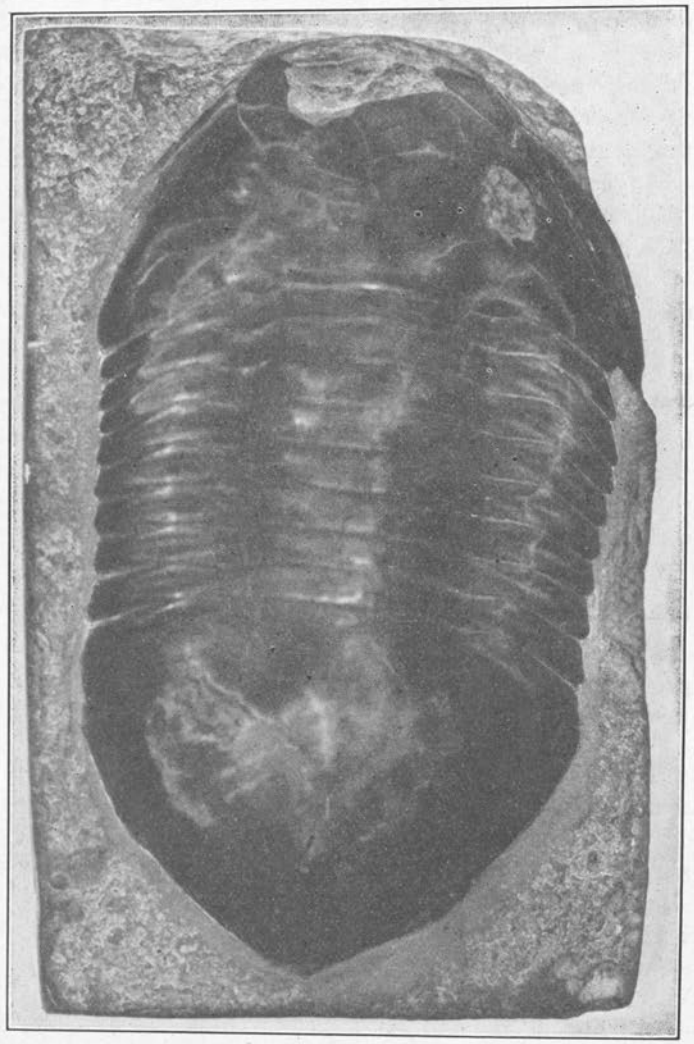


FIG. 19. A TRILOBITE FROM KENTUCKY.
An unusually fine specimen collected by W. J. Curtis on his farm in Robertson County.

The name "trilobite" refers to the fact that the dorsal shield is divided into three rather distinct lobes, a central or "axial" lobe, with a lobe on each side, the "pleural" lobes. The entire shield was segmented and the segments of the pleural lobes bore projections called the pleural spines.

In general physiology and habits trilobites were probably much like certain of our modern crustaceans. They were undoubtedly marine since they are always found associated with such other forms as corals, crinoids and brachiopods which are typically salt water animals. The food, as judged from the mouth-parts and intestine, was apparently animal matter. both living and dead, which was seized by the appendages, carried to the mouth and macerated by mandibles. Sense organs are represented by the eyes and the antennae. Breathing was accomplished through hair-like structures on the appendages and ventral membrance. It is possible to distinguish parts of nervous, circulatory and muscular systems. Judging from the muscles, as indicated by muscle scars and attachments, many trilobites had the power to curl themselves into a ball in the fashion of their modern relatives, the pill-bugs or sow-bugs.

Trilobites are extremely abundant in our Ordovician rocks and certain species are used for the index fossil for some of the Eden formations. Typical forms are among the easiest of all fossils to recognize because of the characteristic three-lobed appearance.

The Silurian Age is represented by only a comparatively thin layer of rocks in Kentucky. These formations are classified as follows:

System	Series	Stage	Substage
Silurian	Niagaran	East of Arch	Louisville
			Waldron
		Alger (East)	Laurel
			Estill
		Osgood (West)	Waco
			Lulbegrud
	Oswegan	Indian Fields	Oldham
			Plum Creek
		Medina	Brassfield

It was during this age that the great "Cincinnati Arch" was lifted out of the sea, and between this time and the next

submergence (in the Devonian Age) much of this rock was eroded away so that it now measures only about 350 feet in thickness at its maximum. The fossils of the Silurian formation are largely those of corals, crinoids and brachiopods, very similar to those found in the Ordovician.

PHOTO BY W. R. JILLSON

FIG. 20. AN ANCIENT CORAL REEF.
Fossil coral exposed in Ohio River.

During the first part of the Devonian Age, Kentucky was apparently out of water and great erosion was taking place for in this State the rocks of the Mid-Silurian Age are immediately overlaid by the formations of the Mid-Devonian. This interval, during which no rock was deposited, must have been a very long one, for in Pennsylvania we find strata two thousand feet thick which were formed during this time. About the middle of the Devonian Age a submergence took place and the middle and upper Devonian formations are represented by a lower limestone series and an upper shale series as follows:

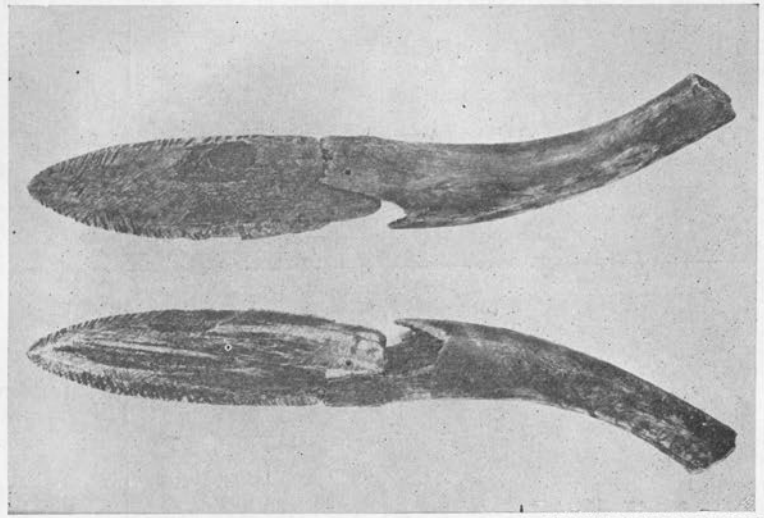
System	Series	Stage	Substage
Devonian	Upper Devonian	Genesee	Ohio
	Middle Devonian	Hamilton	Delaware
		Onondaga	Columbus

The Columbus limestone is characterized by the number and perfection of its corals, which are so abundant that it is evident that in some localities, such as the Falls of the Ohio at Louisville, there must have been in ancient days a great coral island or reef.

In this limestone are also found fine fossils of brachiopods and gastropods.

The Upper Devonian formation is almost entirely black shale which contains few fossils. In this shale, however, have been found the remains of both land and water plants, brachiopods and fish.

The great Carboniferous Age, during which the immense coal deposits were formed, is represented in this state by two great systems of rocks, the Mississippian and the Pennsylvanian. Both of these systems show numerous formations in Kentucky which are classified by geologists as follows:



ONE-THIRD NATURAL SIZE

A FINE INDIAN KNIFE

This splendid weapon was found by Charles B. Hodges in a rock house on the waters of Cub Run Creek, Western Hart County, Ky. Collected by Dr. W. R. Jillson, Feb. 5, 1928. The blade is part of an elk's antler, while the handle is fashioned from the rib of a deer. Gut and deer throngs were possibly used to hold them together. Numerous beads and trinkets were found in the same locality.

System	Series
Pennsylvanian	Monongahela
	Conemaugh
	Allegheny
	Pottsville
Mississippian	Chester
	Meramac
	Waverly, E. Ky. Osage, W. Ky.

Stage		Sub-stage	
Henshaw	W. Ky.		
Dixon Lisman	W. Ky.		
Morgantown sandstone Ames limestone Buffalo sandstone Lower Cambridge limestone Mahoning sandstone	N. E. Ky.		
Freeport form. Kittaning form. Vanport limestone Brookville coal	N. E. Ky.		
Carbondale Tradewater (upper part)	W. Ky.		
Breathitt	E. Ky.		
Lee		Corbin Rockcastle Beattyville	E. Ky.
Tradewater Caseyville	W. Ky.		
Mauch Chunk	E. Ky.	Pennington Glen Dean Gasper	
Kinkaid Degonia Clore Palestine Menard Waltersburg Vienna Tar Springs Glen Dean Hardinsburg Golconda Cypress Gasper (Paint Creek) Bethel Renault	W. Ky.		
St. Genevieve		Ohara Rosiclare Fredonia	
St. Louis		St. Louis	
Warsaw		Spergen Harrodsburg	
Logan		Vinton Allensville Byer	
Cuyahoga		Berne Blackhand New Providence	
Kinderhook		Sunbury Berea Bedford	

The Mississippian includes the Waverly sandstones which are exposed to form the "Knobs" and the famous "Muldraugh's Hill"; the Mammoth Cave limestones which are noted for their immense caverns; and the Chester series of sandstones, shales and limestones which surrounds the western coal-fields in a belt from five to ten miles wide and is characterized by the strip of poor agricultural land which it marks. The Mississippian is rich in fossils, including bryozoans, pelecypods, blastoids, crinoids, corals, brachiopods and fish so that we know that life during this period was abundant. Some of these fossils are extremely interesting, particularly the crinoid, *Platyorinus sculptus,* the jointed, hollow stems of which are popularly known as "Indian beads" in the localities where they are found.

The Pennsylvanian is the great "coal-measure" formation in which the seams of coal are found between deposits of sandstones, shales or impure limestones. Geologists are not agreed as to whether the great masses of plants which were fossilized to form coal grew in vast marine swamps at the spot where the coal is now found or whether it was fresh-water vegetation floated there by the action of the streams. Whichever explanation is correct, the Pennsylvanian Age represents a time when the land plants and animals were beginning to appear, for the formations show evidences in the forms of tracks and fossilized skeletons of amphibious animals which were becoming independent of an aquatic life and fossils of plants which are distinctly land forms.

Thus the end of the Pennsylvanian ushered in the closing period of the reign of the marine forms in that part of the globe which is now Kentucky. New and higher forms were destined to take their places as the dominant animals of the earth. The land masses were increasing in size and the seas becoming smaller. Slowly the northern waters were pushed back by the rising continent, still more slowly the southern seas became shallower. Finally, sometime during the late Tertiary period, the waters receded for the last time and entirely from the "Purchase" region of Western Kentucky and this State was no longer the home of the Animals of the Ancient Sea.

CHAPTER III

EARLY LAND ANIMALS

The first land animals appeared in central North America toward the close of the Pennsylvanian. In the succeeding Permian Age they became prolific in numbers, particularly in favored localities. Among these animals were certain ancient amphibians some of which were giant species seven feet long with a head nearly two feet long while others were diminutive creatures with skulls no longer than a man's thumb-nail.

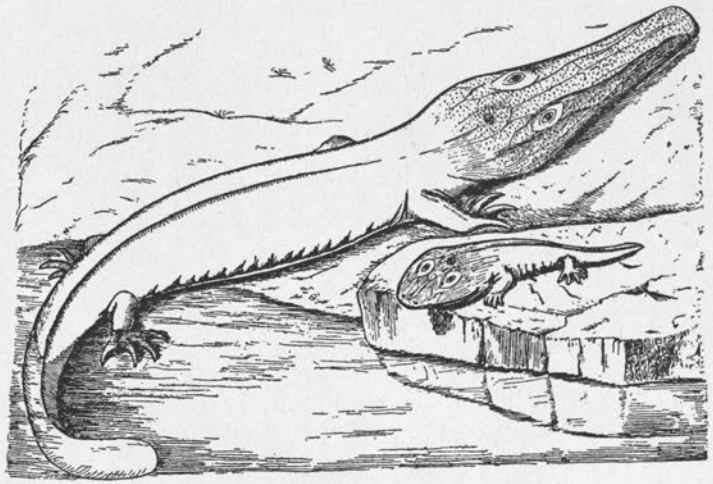
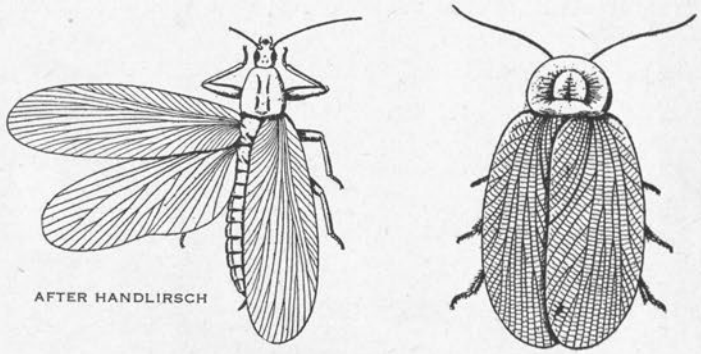


FIG. 21. STEGOCEPHALIAN AMPHIBIANS OF THE LOWER PERMIAN. One of the larger Stegocephalia (Archegosaurus), 5 feet long, with a heavily armored skull and a small tadpole-like form (Branchiosaurus), 6 inches long, whose entire ventral surface bears scales. Note the third or pineal eye. From Museum Guide of the University of Tubingen.

With them are found early types of reptiles some with great beaks armed with conical teeth. At this time also appeared insects including enormous dragon-flies some of which had a wing-spread of over two feet and giant cockroaches three to four inches in length. In fact the Pennsylvanian is known to entomologists as the "Age of cockroaches" since more than five hundred kinds are known from this period. Several hundred species of insects are known from the American Coal Measures

alone, contemporary with the amphibians as land animals and with tree-ferns and conifers as the dominant plant forms.

During the Permian the amphibians began to be overshadowed by the reptiles which were undoubtedly their descendants and by the end of the Paleozoic the amphibians had forever lost their place as the foremost of land animals. Although they were the ancestors of all terrestrial vertebrates, the amphibians declined rapidly until today they are among the most insignificant and unsuccessful of all of the animals of their phylum.

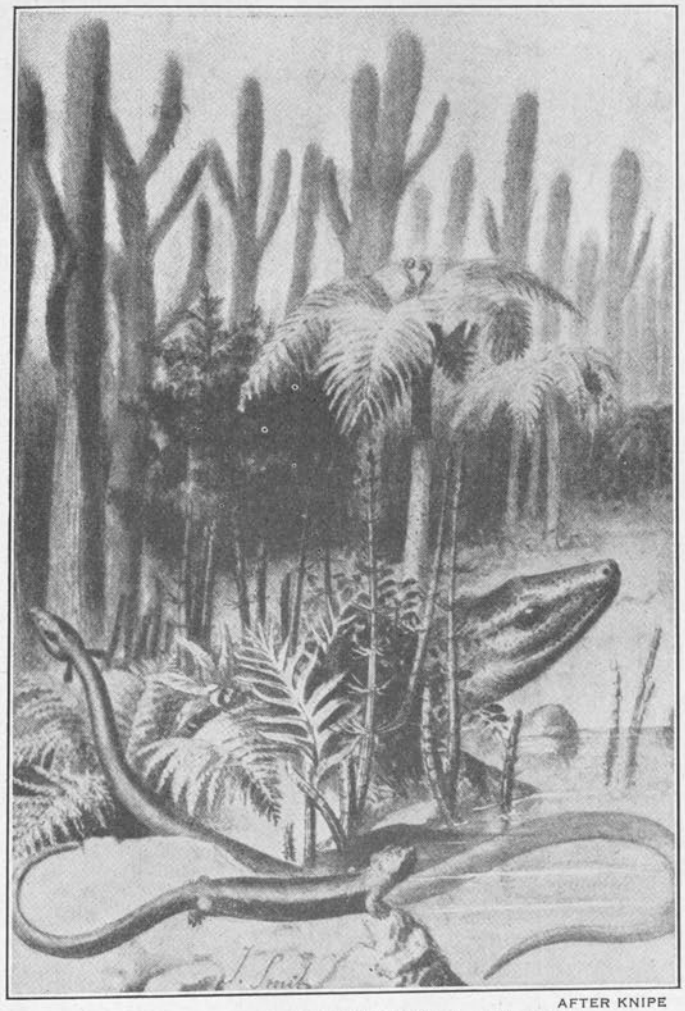


AFTER HANDLIRSCH

FIG. 22. ANCIENT COCKROACHES.
Very similar in appearance to those of modern times.

On the other hand the reptiles prospered and increased. New forms and unusual types of specialization evolved rapidly. During the Triassic the swimming reptiles, the flying or gliding reptiles and the scaled reptiles appeared upon the scene—crocodilians, turtles, lizards, serpents—a vast assemblage of reptilian forms, and by the middle of the Mesozoic Era the giant dinosaurs had taken their place as the lords of this mighty horde. The reptiles were the rulers of the earth.

The reign of the reptiles was a long and successful one. All through the Mesozoic their supremacy was unchallenged. Early in the Triassic the stegocephalian reptiles attained dominance. The great crocodile-like reptile, *Mystriosuchus* is a common form among the earliest of the fossils of this period. The *Ichthysauria* (fish-reptiles) were apparently almost entirely aquatic in habit, differing from all other reptiles in the important



AFTER KNIPE

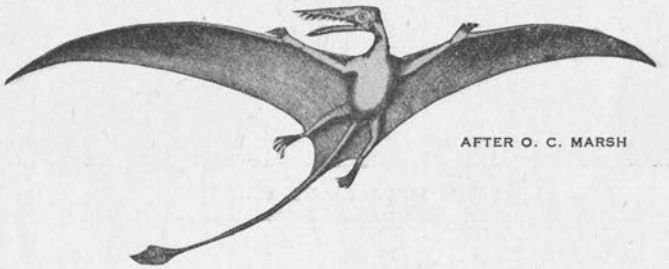
FIG. 23. THE BEGINNING OF LAND LIFE.
A scene in Central North America during the Pennsylvanian Age.

reproductive function of coming ashore to lay eggs. They bore their young alive in the open sea. The *Plesiosauri* were large flattened saurians with long slender necks and short heads. They were active carnivorous fish-eating marine forms and doubtless the terror of all other inhabitants of the sea. The *Pterosaurs* were the famous "flying reptiles" a few of which had a wing-

PHOTO BY S. C. BISHOP

FIG. 24. THE SALAMANDER.
A modern amphibian.

spread of twenty feet. The most of these were much smaller. They were the "gliders" of the Jurassic seas. These flying reptiles were most peculiar in appearance with hollow bones, bird-like heads and great membranes or "wings" stretched bat-like from the forelegs to the hindlegs and tail. Several species of the Chelonia, true turtles, appear in the later Triassic indicating origin in the late Paleozoic, and toward the close of the Mesozioc, the giant sea lizard Mosasaurus. But most wonderful of all were the *Dinosaurs* which represented the last word in reptilian specialization. Nothing like them has ever been seen on the earth before or since.



AFTER O. C. MARSH

FIG. 25. RHAMPHORHYNCHUS PHYLLURUS.
A flying reptile.

The dinosaurs attained remarkable size and diversity early in the Triassic although a number of species such as *Dimetrodon* and *Naosaurus,* true lizards of large size with erect spiny backs were dominant in the Permian. Some were large and some small; some carnivorous and some herbivorous; some were quadruped and some biped; some had spoonbills, others were armed with enormous horns; some were smooth-bodied while others were protected by massive plates of armor. One of the great herbivorous dinosaurs, *Brontosaurus,* was over sixty feet in length and must have weighed many tons. The great *Tyrannosaurus rex* was nearly fifty feet long, twenty feet high, with teeth six inches long and claws which measured almost a foot in length. The power and strength of such an animal can hardly be imagined. Newman says:

"One can readily imagine a scene of carnage, the like of which the modern animal world cannot afford, when such a reptilian dreadnaught went into action."

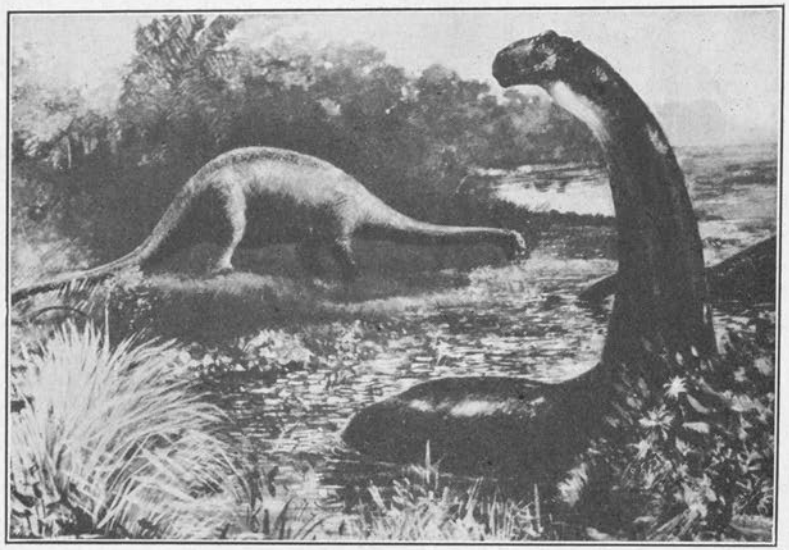


FIG. 26. A GIANT REPTILE.
Brontosaurus, an American dinosaur of the Mesozoic.

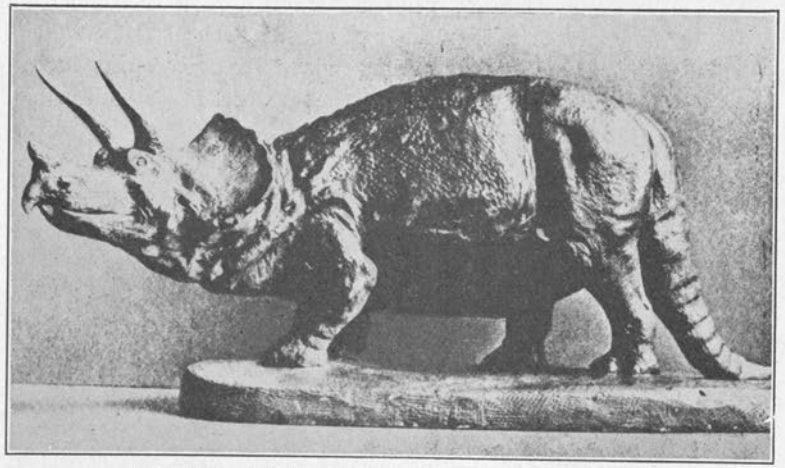


FIG. 27. A FORMER RULER OF THE EARTH.
Triceratops, a cretaceous dinosaur.

and Schuchert assures us, speaking of the Cretaceous ceratopsians:

"That the ceratopsians did fight, and that most desperately, is shown by the grievous 'old dints of deepe woundes' that remain on many a skull, fractured and healed jaws and horns, pierced crania and crests. As these were only the relatively few wounds which penetrated the bone, what battle-scarred old veterans they must have been after their century or more of life."

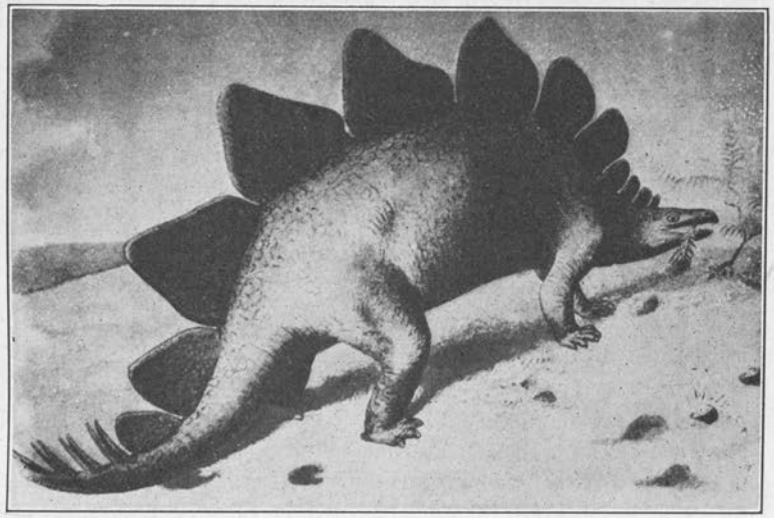


FIG. 28. STEGOSAURUS.
An armored dinosaur.

These mighty beasts ruled the earth for over nine million years and then suddenly, as geological time is figured, they disappeared. The real cause of their downfall is ascribed to a rapid rise of the active and intelligent mammalian forms and a complete change in world climates.

Lull says:

"One of the most inexplicable of events is the dramatic extinction of this mighty race, for in the rocks of undoubted Tertiary age not a single trace of them remains. The causes of their extinction are conjectural; but this we know, that with the extensive changes which marked the close of the Mesozoic, came the blotting out of a heroic race. . . . Their career was not a brief one, for the duration of their recorded evolution was thrice that of the entire mammalian age. They do not represent a futile attempt on the part of nature to people the world with creatures of insignificant moment, but are comparable in majestic rise, slow culmination, and dramatic fall to the greatest nations of antiquity."

Thus ended the great age of the reptiles, an age which witnessed the rise and fall of an empire of giant proportions and immense dramatic interest. For the reptiles must be regarded with much respect since they were the dominant animals on the globe for a longer time than any other class and although their reign is over they are still a vigorous and persistent group. From the dawn of the Paleozoic up to the present have passed over thirty million years and during all this time the reptiles have held on though diminished in species and numbers. Compared with this record the dominance of man is of minor significance.

But in spite of the passing of the great reptiles, a few members of the class survived to become the ancestors of our present forms and these, as would be expected, were not the monsters of mighty bulk and heavy armor (the sure signs of a senescent race which can not survive world cataclysms) but the more primitive forms which had not become specialized and thus were readily adaptable.

So out of the wreck of the reptilian empire of more than twenty great orders. we have only six orders left today (some authorities claim only four) and of these, two are questionable since chameleons, lizards and snakes may belong in one order as compared with fossil orders, and one order is represented by only one species (Sphenodon) which is rapidly becoming extinct.

From these early reptiles were developed the birds which at first were extremely reptile-like in appearance with sharp teeth, long tails and saparate carpal and metacarpal bones. Other reptiles were more or less mammal-like in appearance and perhaps were ancestral to the mammals which later appeared upon the earth.

During the Cenozoic the mammals succeeded the reptiles as the highest and dominant form of life. Early in the Eocene mammalian forms are noticeable and their development was rapid and varied so that before the end of this period the herbivorous animals, the carnivores, the rodents and the bats were clearly distinguishable. In the early evolution of these lines, many curious forms appeared but most of these soon became extinct, while the more adaptable types survived to become the ancestors of the mammalian life of the present.

Thus during the long Mesozoic and Cenozoic Eras strange and grotesque creatures must have inhabited that part of the earth which is now Kentucky if we may judge from the fauna which is known to have been represented in this part of the American continent. In this state, however, the formations

FIG. 29. THE LIZARD.
A modern reptile.

which represent these eras are either absent or but slightly represented in Western Kentucky and therefore rather meager evidences of the life of this period are available. But with the Pleistocene Age the Kentucky record again begins and we have an abundant and interesting series of forms.

With the beginning of the Glacial Age we find evidence of abundant plant and animal life in Kentucky. During part of this period, the Glacial Age, the great ice sheets came down from

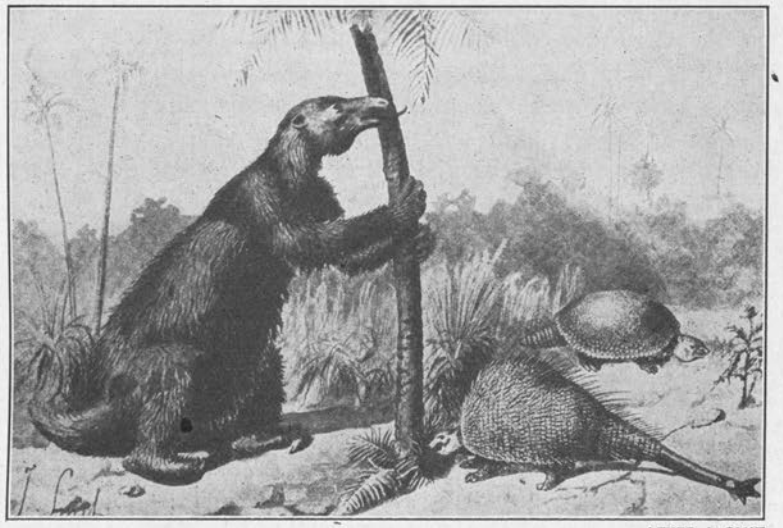
the north sweeping all life before them. Recent discoveries by Dr. W. R. Jillson, State Geologist, would indicate that some of the earlier glacial invasions penetrated for a considerable distance into Kentucky but in the later glacial periods these enormous masses of ice did not disturb the state to any great extent but melted along the Ohio River region and then slowly disappeared northward.

Immediately after the Ice Age there must have been a most marvelous and interesting assemblage of land animals in Kentucky. Certain northern forms had been driven southward by the advancing ice as is indicated by the discovery in the Breck Smith Cave in the Blue Grass Region of the remains of a polar bear. The enormous numbers of herbivorous animals are evidenced by the tons of bones of these forms which have been taken from such localities as Big Bone Lick and Blue Lick Springs where for centuries the great herds came for salt and where their bones were trampled into the swampy soil.

The ancient flesh-eating animals, attracted by the abundance of prey, followed the herbivorous forms and were thus assured of unlimited food. There is no lack of evidence regarding these animals. Bones of the mammoth and of the tapir, bones, teeth and tusks of the mastodon, and bones and impressions of many other animals, most of which are extinct and none of which are now native of this region, have been found in abundance in Kentucky. The Indians and later the early settlers were impressed with the "big bones" which they discovered in this State. As early as 1739 the French explorer de Longeil remarked on the interesting material seen at Big Bone Lick in Boone County and in 1751 Cristopher Gist brought a mastodon's tooth as a curiosity from this locality. Since then many complete skeletons have been secured from such repositories for the museums of this country but unfortunately none have been kept in Kentucky.

Some of the species of Pleistocene mammals actually recorded from the State are of such interest as to deserve special mention.

One of the most remarkable of these was the *Megalonyx* which was first discovered and named by President Thomas Jefferson. It was one of the ground sloths which were abundant and widely distributed during the Pleistocene. Its remains have been found at Big Bone Lick and also near Henderson, Kentucky. A smaller sloth, *Mylodon harlani,* one of the oldest of the edentates of this continent is represented by bones discovered at both Big Bone Lick and at Blue Lick. Some of these prehistoric sloths were very large; one southern form, *Megatherium,* having a body as large as that of an elephant, though its legs were shorter.



AFTER J. SMIT

FIG. 30. MEGATHERIUM
A giant sloth of the Pleistocene.

Another of the most remarkable of the animals of the Pleistocene was the giant beaver, *Castoroides ohiensis.* This animal was apparently peculiar to this part of the world as it has never been reported from the Old World or from South America. It was simply an enormous beaver much like those of today but as the common name would imply was a giant in size and is believed to have been as large as a black bear. Teeth and bones of this beaver have been found in the eastern mountains of Kentucky.

Of the odd-toed Ungulates, the *Perissodactyla,* two species are known from Kentucky—an ancient tapir and a pre-historic horse.

The tapir, *Tapirus sinensis,* is recorded from McConnell's Run in Scott County and from Yarnellton Station in Fayette County. Tapirs are now confined to more southern latitudes and the modern forms have changed but little from the earliest recorded types. They are characterized by the long, flexible snout which is indicated in the fossil skulls by the shortened nasal bones. Fossils of the tapir are rare, probably because these animals were forest-loving beasts whose habits kept them away from places where their bodies might be buried in sediments where they could be preserved.

The early horse, *Equus complicatus,* has been found at Big Bone Lick. Horses belonging to the modern genus *Equus* are known to have been in existence in North America as early as the Pliocene and by the Pleistocene they were abundant. Our modern horse, however, was not among them but was introduced from Europe after the American forms had perished as they did at about the close of the Pleistocene.

Of the even-toed Ungulates, the *Artiodactyla,* we have a much longer Kentucky series from the Pleistocene.

The peccaries, or American Swine, are now chiefly tropical and subtropical in distribution but in early times the old genus *Platygonus* must have been widely distributed. Remains of several skeletons of a prehistoric species, *Platygonus compressus,* have been found in Kentucky, three or four at Big Bone Lick and one on Crooked Creek in Rockcastle County.

The deer family, the *Cervidae,* are well known from Kentucky records. Deer were abundant here during the Pleistocene, the modern genus *Odocoilus* being then in existence. This deer, of which the common Virginia Deer is a familiar example, is a typically American form and must have had a long American ancestry.

The wapiti, *Cervus canadensis,* was common. Bones and horns have been found at Big Bone Lick and in Wayne County. This animal has persisted up to the present although not now found in Kentucky, and is generally but erroneously called the "elk." It is really related to the great stag of Europe and is probably of Old World origin.

The caribou, *Rangifer tarandus,* another Old World immigrant, was present in Kentucky during this period. Bones from

Big Bone Lick have been identified as representing this species, and fossil horns probably used for ceremonial purposes which have been found in old Indian graves seem to be the same.

Bones of a Pleistocene moose have likewise been found in this State. It seems to be the same species, *Alce americanus,* as our present form and probably like the wapiti and caribou was or European origin and came into Kentucky from the north. The moose is the largest and most powerful of the Cervidae and is distinguished by the prehensile proboscis-like snout and the broad, flattened, palmated antlers.

By far the most interesting and remarkable animal of the deer family in Kentucky during the Pleistocene was the famous "stag-moose," *Cervalces scotti.* The genus to which this animal is assigned (*Cervalces*) is different from any now living and as the name would suggest seems to include characters of both the stag genus (*Cervus*) and the moose genus (*Alce*). It was probably quite moose-like in appearance but with a much shorter snout and quite different horns. The stag-moose was apparently a late arrival in Kentucky, appearing during the last ice invasion. It must have been a magnificent animal, larger than our present moose. Its bones have been found at Big Bone Lick.

At Big Bone Lick has been found, also, the remains of an extinct musk-ox, *Bootherium bombifrons,* representing a group of animals now found only in the far north but which were apparently far more widely distributed in the Pleistocene.

The only true members of the great ox tribe, however, that ever reached America were the bisons, often incorrectly called "buffalo" in this country. The bison were migrants from the Old World where one species still persists with great difficulty just as another species in this county has persisted although in constant danger of extermination. Two Pleistocene species of bison are known from Kentucky, both from Big Bone Lick. Both were described by Leidy, one as *Bison antiquus* and the other as *Bison latrifrons.* The latter, a gigantic animal with immense horns spreading ten or twelve feet is believed by some authorities to be the parent form of all the bisons, passing through *B. priscus* into the present European form and through *B. bonasus* into the later American form. Since the bison known to the Indians and the early settlers (*B. bison*) also frequented

Big Bone Lick it would appear that this locality must have been known to the salt-loving animals through long ages and that it was actually used by bison representing successive stages of evolution.

The carnivores were undoubtedly abundant in the Pleistocene but only one form is positively recorded from Kentucky. This is a bear of the true bear genus, *Ursus,* remains of which have been found at Big Bone Lick and in the Phelps Cave in Fayette County. Bones of a fox (var. *scotti*) now an inhabitant of warmer climates were found in the Breck Smith Cave near Lexington; this may represent Pleistocene material. In the same cave were found bones which have been tentatively determined as those of a polar bear.

By far the most interesting, however, of all the animals which inhabited Kentucky during Pleistocene times were the great elephant-like animals of the order *Proboscidea.* From the view-point of the present geographical distribution of animals on earth it seems strange that the elephant group should have been represented in North America. That it was represented, and very abundantly, there is of course no question. Three types of these ancient beasts—the mastodon and two species of mammoths—are known from this State.

The mammoths were ancient elephants and are placed in the same genus (*Elephas*) as the elephants of today. They ranged over all of northern Europe and Asia and probably crossed over the old land bridge from Siberia to Alaska and thence moved southward through North America as far as Central America. They were named from the Tartar *mamma* (earth) because their bones were always found underground. The word has since come to mean "huge" on account of the great size of the animal and of its bones. Many curious ideas have been held regarding the mammoth. The Chinese believed it to be some form of giant mole since its bones were always found in the earth; the pious early Europeans believed the bones were those of Saint Christopher; and an equally pious New Englander pronounced them bones of Biblical giants. Much of the fossil ivory of commerce comes from the tusks of mammoths.

The best known mammoth, *Elephas primigenius,* was abundant throughout the northern hemisphere. It is of this species

that complete carcasses have been found frozen in northern Siberia. That it was adapted to cold climates is indicated by its dense woolly hair. The animal stood about nine feet high at the shoulders and its immense tusks had a tendency to spiral curvature. Perfect skeletons have been found at Big Bone Lick and excellent tusks and bones at Blue Lick Springs.

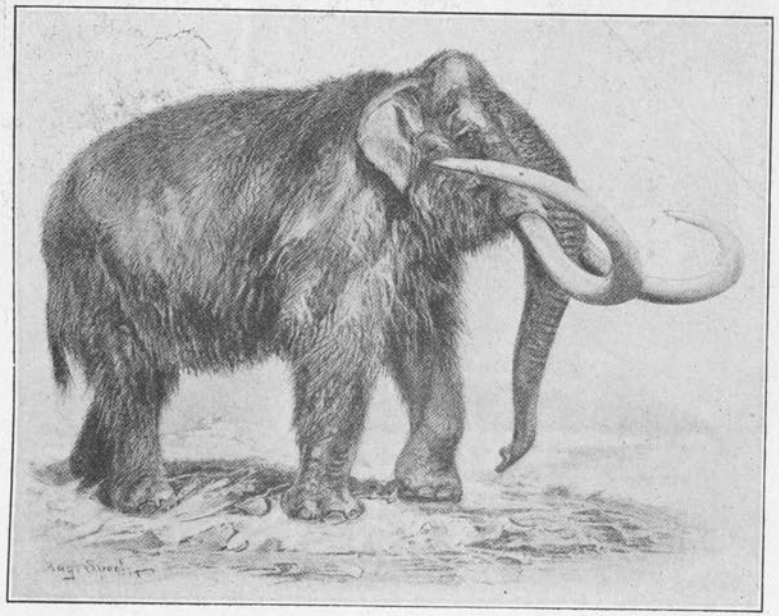


FIG. 31. THE MAMMOTH.
An early immigrant to Kentucky.

The Columbian Mammoth, *Elephas columbi,* was a larger and more southern form. Standing eleven feet high at the shoulders, its huge tusks curved first downward, then upward and inward, their tips crossing when full grown. Remains of this mammoth have been taken from Big Bone Lick.

The American Mastodon, *Mammut americanum,* belongs to a quite different and more ancient genus than the mammoths. It was old even in Pleistocene days and Scott speaks of it as "a belated survival of an ancient type, seemingly out of place even in the strange Pleistocene world, which had so many bizarre creatures." The mastodon was apparently a forest dweller and

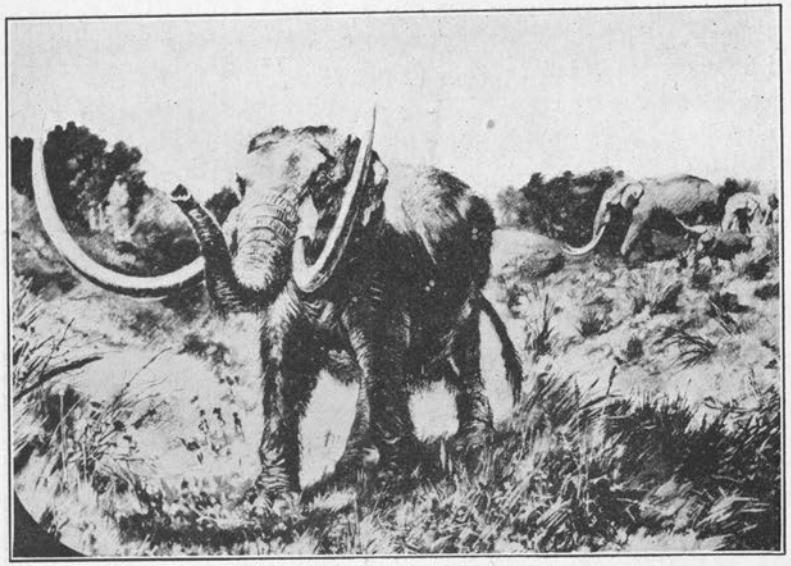


FIG. 32. THE MASTODON.
A Kentucky forest-dweller.

fed on the leaves and branches of trees. It was about the size of the mammoth with long coarse hair and long tusks which were directed almost straight forward. Curiously enough, it outlived the mammoths and may have been contemporary with man in North America. Its bones have been found in abundance in Kentucky, particularly at Big Bone Lick, Blue Lick, and in the Green River valley and it was of this animal that Dr. Goforth secured a four horse wagon load of teeth in 1804.

CHAPTER IV

NEOLITHIC MAN

Neolithic man lived in Kentucky. This does not mean that he was necessarily contemporary with men of the same culture in Europe or in any other part of the world, for men of various stages of development may be represented on earth at the same time and the same culture may flourish over a long period of years, but certainly there existed in this part of the Mississippi Valley a people who had not progressed beyond the stage of stone artifacts and bone implements, who doubtless used wood and skins and had learned the use of fire, who had developed ceremonies and perhaps religious rites, who buried their dead, and in other ways represented that stage of man's progress which we speak of as "Neolithic."

Who these people were we do not know—perhaps will never know—but certain it is that the occupation of America far antedated its discovery by modern Europeans. The Indians who inhabited the country between the Alleghanies and the Mississippi when that region was first invaded by the white man were not the original inhabitants of the country. Collins states in his "History of Kentucky:"

"Ancient monuments, of deep interest but imperfectly investigated —the remains of walled or ditched towns, of mounds, graves, temples, and teocalli—tell of a race of men who preceded the rude tribes encountered by Boone and Findlay. Their origin, language and history are buried in darkness which may never be dispelled; but the scanty vestiges left behind assure us that they far surpassed, in arts and civilization and knowledge, the savage tribes which succeeded them. They had worked the copper mines of the west, and were in possession of copper tools for working in wood and stone. Their pipes and household utensils, elaborately fashioned of clay, are far above the rude and clumsy contrivances of their successors; while their large fortifications, constructed of solid masonry, and artificially contrived for defense and convenience, show that they had foes to resist, and had made considerable progress in the military art. How long they occupied the country, whence they came, whither they have gone, whether they perished within the crumbling walls which speak of their existence, or were driven hence by a more hostile race, our knowledge does not enable us to decide. Time and future investigation may throw additional light upon the history of this ancient race. At present we can only say that they lived, that they struggled against their enemies, that they made progress in arts and civilization and that the places which once knew them now know them no more."

Indeed it is not impossible that the people of whom Collins thus writes may have been superior in many ways to the Indians who were found here at the time of the first white settlers, for nations and races have their rises and declines and often retrograde after reaching considerable heights, and we are more and more inclined to think that the historical American Indian was not as highly developed as his more admiring historians would have us believe.

However, we must go farther back than the immediate predecessors of the Columbian Indian to find the true neolithic stage and again the question arises as to who first inhabited the American continent. In this connection there are many interesting traditions, most of which have been discarded by scientists as improbable or even preposterous but which have been the source of many theories and speculations.

One of the oldest and most interesting of these is the famous *"Atlantis"* tradition which supposed the existence of an ancient island in the Atlantic ocean between Europe and America which would have furnished a stepping stone between the old and new worlds. Plato mentions this tradition as having been handed down by Solon who learned it from Egyptian priests. According to these priests the vast island had been submerged more than nine thousand years before that time, but accounts of its appearance and occupation were still preserved. The Atlantis tradition has been practically discarded but is occasionally revived by modern scholars who think they have found scientific evidences of the existence of this mysterious island, and quote various geological and geographical facts to support their views. Since Solon's story of Atlantis is nearly three thousand years old and the date of the sinking of the island is supposed to be nine thousand years before this date, the acceptance of the tradition would account for the possible discovery of America some twelve thousand years ago.

Another interesting tradition popularly known as the *"Phoenician Tradition"* is based on the account by Diodorus Siculus, who lived nearly a century before the Christian Era, of a great island in the Atlantic ocean many days' journey from the coast of Africa, which was discovered by Phoenecians who described it as a rich and wonderful land. Siculus describes

this land as thickly inhabited by a strange race who lived in stately buildings and enjoyed a high state of civilization. Supporters of the Phoenician tradition would argue that this land was South America, even at that early date occupied by the Incas or their ancestors.

A theory which has far more evidence to sustain it, however, than either of the preceding, is the *"Mongolian Theory"* which claims that the first visitors to America were Chinese or Scythians who made the journey from north-east Asia by way of the Bering Straits. In fact there is an account in Chinese history of a certain monk named Hoei Schin who discovered America in the year 499 and named the country "Fusang." This is not at all improbable as it would not be difficult for a venturesome sailor to cross the comparatively narrow channel with its numerous islands without being out of sight of land for any great length of time.

The *"Norse Tradition"* claims that America was discovered by hardy Norsemen not later than the close of the tenth century. It is claimed that Iceland was settled by Scandinavians in 860 and that this island was known to the Greeks several centuries before the Christian era. Since it is known that the Norsemen were great navigators from early times, it is not unreasonable to think that some of these pioneer voyagers might have reached the northern shores of this continent.

An Irish saga of ancient date is responsible for the *"Irish Tradition"* which credits the first settlement of America to some wanderers from Ireland who reached those shores by way of Iceland and established a colony somewhere on the Atlantic coast as early as 1029. This again is not impossible, as the Irish were good navigators and are known to have visited Iceland at an early date. If they could get to Iceland, they could probably have reached America.

The *"Welsh Tradition"* which gives the honor of the first settlements to the Welsh sometime during the twelfth century is also not without supporters and is discussed in a following chapter on "The Stone-Grave People." This tradition is based on the account of Prince Madoc which has been often quoted to support the theory.

A much discussed *"Egyptian Theory"* is founded on the claim that certain Aztec decorations and architectural designs are strikingly similar to the Egyptian motifs. Such a theory supposes the spread of early Egyptian culture to the new world and explains the first migrations to the Mississippi Valley as coming from the south rather than from the east or north.

The *"Northern Invasion Theory"* accounts for the settlement of middle America by a people of Eskimo origin whose antecedents are lost in the mist of time. Evidence of very early man has been found in the far north and a spread of such a people southward is conjectured.

"The Ten Lost Tribes of Israel Theory" was for a time the popular explanation of the ancestry of the American Indian. When it was found, however, that the Indians instead of having a single language related to the Hebrew, had hundreds of languages, none of which were even remotely related to Hebrew and many of which were unrelated to each other, and when it was found that the practices of the Indians while in some few instances did suggest the customs described in the Old Testament, were in most cases very peculiar to themselves and even peculiar to special tribes, this theory was soon abandoned. The ignorance of metals, the lack of domestic animals, the dislike of permanent habitation and the failure to appreciate agriculture were only a few of the practices which failed to agree with what would be expected of Hebrew descendants.

The *"White Indian Tradition"* was a tradition handed down by the Indians themselves. Many Indian tribes insisted that before the red man appeared, a white race inhabited this country and that it was this white race which had built the mounds, made the flint arrow heads and erected the fortifications with which the Indians were perfectly familiar but which they claimed were here when the red man appeared upon the scene. The Indians insisted that this white race had been entirely destroyed many moons before the arrival of Europeans. This was an old and well established tradition and there are some who believe that there must have been some facts to support it. The very weakness in the theory, however, lies in the fact that it is

an Indian tradition for Indian traditions are notoriously very untrustworthy. Even those traditions handed down by the Indians which referred to comparatively recent historical events, concerning which the facts are well known, are grotesquely distorted and exaggerated and it is hardly to be expected that traditions of events of the far distant past could be seriously considered as reliable.

These theories and others, however, can do little more than convince us of the fact that America was not after all "discovered by Christopher Columbus in 1492" as the school children have been taught to believe. In fact, it may not have been discovered at all, for as Colonel Durrett suggests in his very interesting volume on the "Earliest Visits of Foreigners to North America," if it were possible for the Phoenicians or the Irish or the Norsemen or the Welsh or the Chinese to have reached America, it would be equally possible for Americans to have reached Europe or Africa or Asia and that therefore the first migrations of the human race might have been from rather than toward this continent. The weight of evidence in this particular field is, however, much against this conclusion. The Eastern rather than the Western hemisphere appears to have been the original and ancestral home of man.

But even though some or all of the foregoing theories might be correct they would not solve the problem of neolithic man, whose culture was far more primitive than those of the supposed discoverers. The New Stone Age so far as it is now recognized reaches back thousands rather than hundreds of years, at least in Europe, and the crude artifacts of neolithic handicraft must far antedate the ships and weapons of early explorers. While, as has been stated, we have no right to presume similar dates for similar cultures, yet the evidence of prehistoric man in America even as far back as Pleistocene times is rather convincing.

In western Europe the successive periods of stone art—the Eolithic, the Paleolithic and the Neolithic—are fairly well known, and there the Neolithic is presumed to be rather recent, probably later than the last great glaciation which was apparently not more than 25,000 years ago. In America the last great

ice cap came down and dipped into Kentucky. The beginning of its retreat is estimated as about 30,000 years ago but the retreat of the ice was very slow and it may not have ended earlier than 10,000 years ago. It was during about this period that ethnologists believe that man was first on this continent but he may have been here long before that time.

Mr. P. E. Goddard, Curator of Ethnology of the American Museum, in a paper on this subject (Natural History xvii: 3 pp. 257-259, 1926) writes as follows:

"Ten thousand years have been mentioned as the time when men came to America. There are some reasons, however, for thinking that the time must have been longer. According to the old theory, after crossing to America by way of Bering Strait in the North, the Indians moved Southward, made their way down the Isthmus of Panama, and peopled all of South America as well as North America. Some time later they began to cultivate maize which was presumably a plant native to Central America. Maize under cultivation has changed its habit of growth so that it can no longer plant itself, but must be tended by man. In connection with its culture extensive irrigation grew up. After that cities and temples were built, and the higher civilizations of Peru, Mexico and our own Southwest developed. All of this required time. One would be rash to say that it could not happen in 10,000 years, but even more rash to say it did happen in that length of time.

"Still more convincing is the linguistic differentiation. North of Mexico, there are some fifty linguistic stocks or families, that is, fifty languages or groups of languages, so distinct from one another in their vocabularies, that no relationship can be traced. There are many more such families of languages in Mexico, Central America and South America. There are two theories which might account for such a diversity. A people with a single language may have come to America, and remained here so long that wherever a group became isolated its language came to show no relationship to any others, so completely did it become changed. The second theory is that wave after wave of migrating people came across, each with a different language, but leaving behind them in Asia no remnants who preserved the language.

"The growth of civilization in America and the linguistic differentiations, are strong arguments that America has been occupied by man during a very long period."

But even more convincing evidence has been furnished by the paleontologists who have shown that man-made implements and other evidence of his presence are found in strata which were laid down in Pleistocene times.

We have shown that fossils found in stratified rock are records of the life on earth during or previous to the time when that rock was formed. From these fossils we know that certain large mammals such as ancient horses, camels, bisons, mammoths and mastodons were in America during the Ice Age or

Pleistocene. Bones and teeth of these animals are found imbedded in geological structures, particularly gravels, clays and sands which were laid down during the glacial period. If man's bones were also found mingled with the bones of the horse and camel, for example, both of which animals became extinct at about the middle of the Ice Age, we would know that man was also here at that time, and archaelogists are constantly searching for some such evidence. The results thus far are rather impressive. Objects made by man have been found in these sands and gravels along the edge of the glacial drift in a number of instances where there was no doubt as to the formation. Outstanding among these discoveries have been the artifacts reported from Trenton, New Jersey, the flints from the Ohio gravels, the articles undoubtedly made by man found by Professor Loomis underneath the remains of mastodons and mammoths in Florida, the worked flints found by Mr. Harold Cook under the fossilized skeleton of an extinct bison, and the arrowhead found under the scapula of *B. occidentalis* in the Pleistocene beds in Logan County, Kansas. These discoveries have been verified by competent scientists and can not be disputed. Such evidence certainly tends to indicate that man was contemporary of the Pleistocene animals and if so his occupancy of this country may date back at least as long as 25,000 or 50,000 years.

While, therefore, the exact date of early man's arrival in Kentucky is still a matter of conjecture, and while his origin is as yet unknown, the fact that he was here is not to be denied, and from various sources we can arrive at a number of conclusions regarding his life, his habits, and his customs.

We know, for example, either that a large number of people inhabited Kentucky in prehistoric times for a short period or that a small number were here for a very long time. This is evidenced by the enormous number of artifacts which have been found in the State. There is scarcely a farmer boy in Kentucky who has not picked up in the fields from time to time the flint arrow-heads, worked stones, broken pottery and pipes which are so abundant. We assume that these articles must have been lost or discarded by their makers and it must have required either a large population or a long period of time to account for

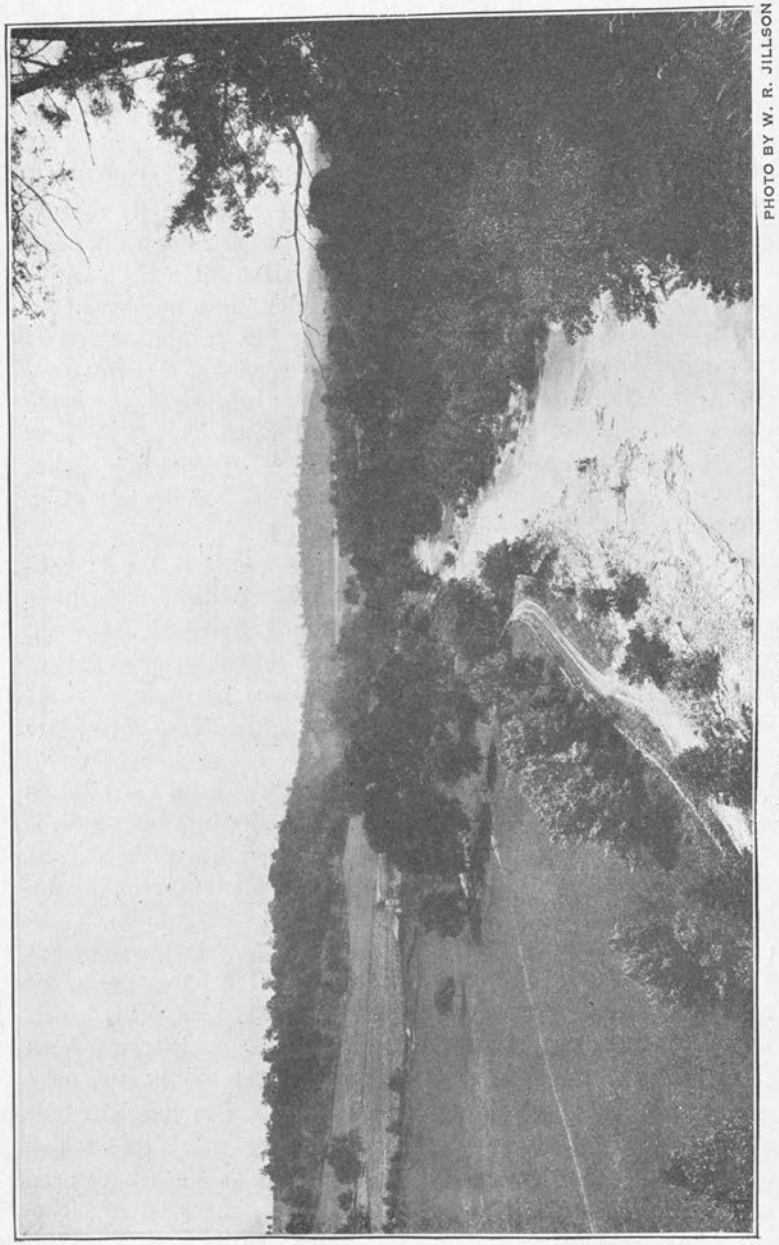


PHOTO BY W. R. JILLSON

FIG. 33. "GOOD INDIAN COUNTRY."
A typical Kentucky river valley.

the accumulation. In some parts of the state these articles may be found literally by the bushel. Fields that have been regularly plowed from very early times still yield more artifacts at each plowing. Collectors have secured tons of such material and almost every farmer has a few which he has picked up in the course of his routine duties and has brought to the house as interesting curiosities.

We know, too, what parts of the state were most thickly inhabited by these early peoples, and we admire their choice of homes for almost invariably the best "Indian Country" is found in fertile regions where the soil is well suited to agriculture and where in early days there were splendid forests. The river valleys were the favorite sites for villages and camps. This was doubtless because the streams afforded the easiest routes of travel and most satisfactory means of transportation. Also the rivers, of course, provided water and the opportunity for fishing.

Again we note that most of the camp sites are situated near elevations which afforded excellent views of the surrounding country. Such locations were doubtless of value for observation and signaling. We can judge something of the occupations of these people from the artifacts found around the camp-sites, in the kitchen-middens and in the graves. The arrow heads of stone and bone, the knives, celts, scrapers and fleshers indicate that they were primarily hunters. Fish hooks, net-sinkers, and scalers show that they were fisherman. Stone hoes and evidences of crops prove that they cultivated the soil. Of course, there were doubtless some groups who followed one vocation more than another but in general they lived as primitive folk have doubtless lived in all parts of the world. The special types of these artifacts will be discussed in detail in following chapters on stone and bone implements and weapons.

That they were warriors is indicated by the fortifications of various types and the war arrows found around these sites. Sometimes these fortifications were more or less elaborate and apparently permanent; more often they were crude barriers of stone surrounded by moats or ditches; occasionally they were placed in strategic positions on the face of the cliff or in the bend of a river.

The practice of fashioning clothing, probably from skins, is evidenced by the various artifacts which are believed to be for the working of skins and by the bone awls and needles which are commonly found, particularly in the graves of the women.

Their food and its methods of preparation are plainly shown by the contents of the kitchen-middens or "trash-piles" which prove vertible storehouses of information in this respect. The bones of the animals which have been eaten, the pottery in which the food was prepared, the hearths upon which the fires were built, the shells of mussels and the skeletons of fish, leave no doubt as to their menus. Apparently the commonest articles of food consisted of deer, bear, elk, and wild turkey since the bones of these animals are by far the most abundant in the middens. Fish and mussels were undoubtedly included in their diet. There seems to be no doubt, either, that maize and probably other grains were cultivated since the agricultural implements, the "hominy holes" and the mortars and pestles for grinding the grain are clearly designed for such purposes. We may assume also that fruits and nuts were easily available and in fact certain types of mortars with peculiar impressions and concavities suggest that they may have been used for cracking nuts. All of these articles are figured and described in other sections of this report.

It is even possible to imagine from the layers of the kitchen-middens, which were the "fat" and which were the "lean" years so far as food was concerned, for in some layers the bones are abundant and often still connected by cartilage while in others they are scarce and each is broken so that even the marrow might be devoured.

Ornamentation must have been common among both men and women. Among the most common of the artifacts found in graves are the beads of stone, shell and bone which may occasionally be discovered to the number of many hundred on a single skeleton. Gorgets and pendants are almost equally abundant, elaborate head-dresses of shells, jaws or teeth are not unusual, necklaces of bears' teeth and of shell are often found and more rarely beautiful and really artistic ornaments of polished stone, the uses of which are conjectural, are discovered. All such things could of course have been used only for decoration. Hair-ornaments, ear-rings and carved shell and bone must be placed in this category and we can imagine that one of these ancient braves, fully attired in his full panoply of shells, bones, necklaces, gorgets and pendants would offer a sight which to say the least would be spectacular.

Most interesting, however, of all of the records which offer a clue to the life of these ancient peoples, are the remains found in the graves. Apparently even the most primitive of men have always had respect for their dead and the various types of burials afford a fascinating and almost inexhaustible field of research for the archaeologist. Different methods of burials and different types of graves are discussed in detail in later chapters but in general it may be said that modes of burial and objects found in graves furnish more information regarding religious and ceremonial practices than any other kind of data which is available.

It is easy to imagine that the burial of the dead was not an easy task in regions where the soil was hard or in winter when the ground was frozen when we remember that no picks or spades or shovels were yet a part of the equipment for digging. Probably all that was possible was to scratch out with a stone or stick a shallow grave and in it place the body. We may assume that certain primitive religious rites were performed in this ceremony and we judge that the position of the body—prone or in a sitting position, on the side or with the knees doubled up under the chin, with the head toward the rising or toward the setting sun, have some significance in relation to the particular form of worship represented.

The position of the body in the grave has been the subject of much speculation and discussion. It has been suggested that one of the common positions—that with the body folded up, the head forward and the knees under the chin— may represent the position of the child in the womb and this indicates a belief in a new birth. Another, and less fanciful explanation of this posture, is that the body was tightly bound to prevent the spirit from escaping to haunt its enemies. Sometimes the position in the grave seems to have a definite significance; sometimes the body seems to have been thrown in with no regard to position. Whatever may be the significance of the position of the body, or

whatever the seeming lack of significance, it has been our practice to always carefully note, photograph and describe it in our field notes. After the body was placed in the grave, certain objects were placed with the corpse—food in pots for use on the trip to the happy hunting ground, weapons to resist the enemies which might be encountered on the journey, implements and utensils for service in another realm of existence—all suggestive of a belief in a future life. In some cases it is evident that other articles—personal effects, emblems of rank or badges of office such as banner stones and boat-stones were likewise placed with the body. Lastly heavy stones were placed over the body so that the wild beasts could not disturb the remains. Very few types of graves, no matter how constructed, are not thus protected. Whether or not this represents the rude beginning of the idea of placing a monument over the dead, we do not know. Certainly we of today do not erect a tombstone as a protection against bears and wolves, but with early man such was doubtless the utilitarian purpose.

Certain Indian traditions would indicate that it was the custom, in the case of a noted warrior or other individual of high rank, to place additional stones or earth over the grave whenever any member of the tribe passed near it. Thus the grave would grow into a mound, and in the case of burials after a battle or a massacre or a pestilence, these mounds might be of considerable size. At any rate, most burial places, whether they be scattered graves, or mounds or cysts are usually marked by the characteristic stones.

One of the most discouraging aspects of the investigation of ancient graves in this state is the fact that so many of them have been destroyed by ignorant persons who because of the desire to find a few flints or the foolish fancy that they may discover a "pot of gold" or other valuables (a supposition which is, of course, most unlikely) have absolutely ruined the grave for scientific purposes. An incident in our own experience will illustrate this point. Some time ago one of our students came into our office bearing a human skull of a very interesting type. He stated that he and some of his companions had dug up this skull at the entrance to a cave. On looking at the skull we found to our surprise and disgust that all of the bones forming

the base of the skull had recently been broken away, thus making it impossible to get accurate cranial measurements and of course making it useless for scientific work.

On inquiry as to why the skull had been thus broken the student rather shame-facedly admitted that he and his companions had made it their practice to go to this cave to play poker each Sunday afternoon and they had discovered that by breaking out the base of the skull it made an excellent receptacle for poker chips—thus the mutilation. Further questioning brought out the fact that they had dug up the skeleton of which the skull was a part, but had no idea as to the orientation of the grave with respect to the points of the compass; that they had thrown out the bones but had paid no attention to the position of the body; that they remembered having found some "old pots" in the grave which pottery they had set up on stumps and broken with stones in a marksmanship contest but could give no description of them; that they did not look for flints or shells or other artifacts. We suspect that this episode is not unique in Kentucky and that many valuable discoveries have been prevented by just such performances.

The examination of a grave is not an easy task. The plane-table map must be made with accuracy; the covering rocks and stones must be removed with great care; the position of the soil layers must be recorded; the actual removal of the earth around the bones must be painstaking not only because of the danger of injuring the skeleton but to insure the discovery of such small objects as shells and beads which often are mixed with the earth; the bones usually must be treated chemically before removing if they are to be preserved since often they will crumble to dust at the slightest touch after a short exposure to the air; the skeleton must be photographed from at least two positions if it is to be again placed in the same posture in a museum case; lastly, if the bones are to be taken away, a careful check must be made of those of every part of the body and they must be handled and packed with unusual care. Naturally such work must be done with other tools than a pick and shovel and by other hands than those of an unskilled laborer.

The uncovering and examination of the skeleton gives us the last and the most important of the information regarding

these early inhabitants of our country. The particular types which seem to be distinctive in certain regions are discussed under other headings in this report but some general facts may be here mentioned. First, there is great diversity in the skeletons and it is apparent that we are dealing with several quite

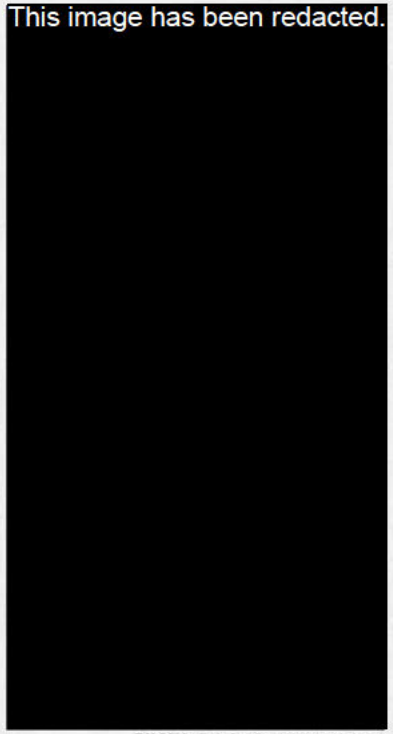


PHOTO BY A. S. HENDRICKS

FIG. 34. A NEOLITHIC MAN.
Skeleton in typical position in grave.

distinct types. The skulls show variations from distinct dolichocephalic to decided brachycephalic and include deformities and malformations of various sorts. This is not surprising when we consider that we are probably dealing with individuals of various ethnological groups and that while some of them are undoubtedly very old, others may be the remains of comparatively modern Indians.

Second, none of them are large in stature. We have not yet found a skeleton, out of over a hundred exhumed, which represented an individual as much as six feet in height. Apparently the prehistoric people were not a large race. Curiously enough, this is in entire disagreement with popular ideas on the subject. We are constantly being informed of "giants" which have been excavated at one place or another. Investigation always shows that if anything they are below average size. A common report is the finding of a skull with a lower jaw so large "that it will slip over the chin of an ordinary man" in which the fact is overlooked that a series of "V"s all of the same size, will "slip over" each other indefinitely. Apparently the story of the finding of an ancient skeleton is not impressive unless the skeleton is of "unusual size" and it is usually so reported in newspaper accounts. In fact, the first remark of onlookers who see an exposed skeleton in a grave is generally to this effect: "My! Isn't he a big fellow!" when in truth the bones may be of an unusually small individual. There must be something about a skeleton in situ which gives the layman an exaggerated idea of its size. The next remark of the interested spectator is usually a speculation or a question on how long the individual has been buried—one of the most difficult of all questions to answer.

However, if the history of the particular region in which the graves are found is fairly well known from the date of the settlement of that part of the state; if the graves have long been considered by the oldest settlers as "Indian graves;" if the graves contain only flint or bone artifacts and typical ancient pottery with no indication of objects suggesting the workmanship of the white race; if the earth has evidently been undisturbed for a very long period; and if the position of the body is characteristic of the "Indian" burial, it may be assumed that the grave is at least "prehistoric." Beyond this it is dangerous to speculate.

The state of preservation of the bones apparently means but little. We have seen skeletons buried in ash-beds or in shell-mounds in well-drained elevations in which the bones were in a most excellent state of preservation, although undoubtedly very old. On the other hand, skeletons in the wet black humus of poorly drained low-lying valleys are often so rotted as to be

almost unpreservable, although nothing about them would indicate great age. Apparently the location of the graves, the type of soil, the drainage and many other factors determine the length of time during which they may remain preserved and the variation between the extremes is very great. We are inclined to think, also, that the very crudeness of the early burials in shallow graves, usually in well drained soil, without coffins and often in wood ashes or salt-peter deposits tends toward long preservation, while on the other hand, our modern methods of burial in deep graves where the soil often retains much moisture, in tight coffins and at a depth where the temperature may be favorable to bacterial action, is conducive to rapid decomposition.

It has been noted, for example, that skulls (which are usually full of earth and retain much moisture) are generally the most decayed of all of the more compact bones of the skeleton. Whatever the reason may be, it is certain that some of the skeletons are very old, but whether they represent pre-Columbian Indians or individuals who lived much longer ago than that period is extremely difficult to state. It is thus not at all easy to determine which of the various cultures represented are contemporary and which are considerably removed in point of time. In the case of the fairly well known groups such as the Fort Ancient and the Hopewell in the Mississippi Valley, such time intervals may be judged with some degree of accuracy by the intrusive burials and by the types of artifacts, but even with such data we must proceed cautiously in drawing our conclusions.

The Culture Problem in Kentucky

When one considers the vast amount of information which has been gathered relative to prehistoric man in the Ohio River Valley and southward, and attempts to organize this information racially and chronologically, one is overwhelmed with the magnitude of the problem, especially as he comes to understand that many different peoples, having different customs and degrees of development and probably quite different origins, have lived over large and generally overlapping areas of our state, at perhaps widely separated periods.

The term "*culture*" has come to be used to designate a distinct race or group of races having a common origin, certain

well defined specific characteristics as to customs and manner of life, a distinct degree of development, characteristic artifacts, and a continuity of occupancy of some distinct area. In Kentucky there are perhaps discernible as many as six or seven groups which might deserve the name of "cultures."

Mention has been made of the so-called "Mound-Builders," originally thought to have been a distinct race or culture. Now the name has come to indicate a rather common practice of many people rather than a specific race. As has been explained, in the Ohio River valley there are located the greatest monuments of prehistoric man to be found anywhere in the world. These mounds represent many types which will be discussed in detail in a later chapter. The intensive exploration of these prehistoric sites in Ohio, Indiana and Kentucky by Squier and Davis, and later by Moorehead, Mills, Smith and Moore, have led to the identification of certain well established cultures in Ohio and Indiana, which in some cases extend into Kentucky.

The Fort Ancient Culture

The most notable of these cultures is that denominated as the "Fort Ancient." This very numerous and powerful people are responsible for the Great Serpent Mound in Adams County, Ohio, and Fort Ancient in Warren County, Ohio, together with a great number of other prehistoric sites. In fact, of some 3500 sites in Ohio, more than half are attributed to the Fort Ancient culture. This culture by no means represents the highest stage of development of prehistoric man in this area, but so numerous are its remains that its possessors must be regarded as a vigorous and dominant people. They made very crude pottery, used characteristic triangular arrow points, both serrated and smooth, used many ornaments of shell and animal teeth, and made extensive use of bone. They also used peculiar arrow points of deer horn, made awls from the ulna of deer, and tarsometatarsus of wild turkey. Their celts were often made of horn, and two-handed scrapers from metapodal bone of deer and elk. They used small cylindrical and elbow pipes of sandstone, and a great variety of sandstone discoidals. They did not use copper to any considerable extent, and except for occasional marine shells showed very little evidence of having obtained materials foreign to their area. They lived in villages, burying their dead

sometimes in mounds, more often adjacent to their dwelling, sometimes actually within it. Their graves were usually simple holes in the earth. Often the skeleton was completely flexed, and often with but few artifacts.

This dominant culture, which probably had its center in the Scioto River Valley, extended into Kentucky, and has certainly been located at Fox Field, Mason County, and Fullerton, Greenup County. The full extent of its southern boundary in Kentucky is yet to be determined.

Chronologically it has no connection with historic times; its origin uncertain, it has left no descendants, but has left a vast number of mounds and village sites, some quite large, to testify to its primitive culture, but dominant occupation of much of the Ohio River Valley at a period estimated to be from four hundred to six hundred years prior to the coming of white men into this area.

The Hopewell Culture

On the north fork of Point Creek, flowing into the Scioto River, Ross County, Ohio, is located a group of prehistoric earthworks, known as the Hopewell Group. Because of the distinct characteristics of the builders of these mounds, the name of Hopewell has been applied to the great culture group of which these mounds are a part. This culture is responsible also for the Harness Mound, Seip Mound, Tremper Mound and the Mound City Group in Ohio. It would seem that in this culture primitive man rose to his highest cultural development ever attained in prehistoric times on this continent.

This culture is notable for its use of native copper, probably obtained from Lake Superior region, for its use of obsidian probably obtained from the far west, for its use of mica, quartz and galena. The general use of such materials shows an extent of trade and travel probably never attained to by other primitive peoples.

This culture appears to have developed the arts of carving stone, and weaving, to a very high degree. Their characteristic zoomorphic platform pipes, and plain platform pipes of red pipestone, show a beauty of form and workmanship far in advance of any other ancient culture group of the Ohio River Valley. While they used mounds for burials, and often

placed the greatest variety of artifacts with the dead yet they also built mounds, which show that in the interior they were charnel houses for cremating the dead.

Cremation was commonly used by the Hopewell Culture, both for individual burials and for community depositories. When the charnel house served a community, as in the Tremper Mound, great basins, ten by twelve feet square, of puddled clay, served as final repositories of the ashes of the dead, to the number of several hundred in such a basin.

So far no absolute proof of occupancy of any site in Kentucky by the Hopewell Culture has been obtained. Yet artifacts of copper and the characteristic platform pipes testify to either their transient occupation of Kentucky, or to their influence upon those living in the area. In a small mound, now long since destroyed by cultivation, on the Peter farm, on the Newtown Pike, some five miles north of Lexington, in Fayette County, were found copper artifacts, believed to have been of Hopewell Culture. On this same site was found a large bird pipe, now in the Smithsonian Institute, at Washington, which would seem to strengthen the theory that here was a lone outpost of this highly developed culture, far removed from its supposed normal area.

More than once the South has been suggested as the place of origin of the Hopewell Culture. This has perhaps been in part due to the artifacts of copper found by Moore in Moundsville, Alabama, along the Black Warrior River. However, there is no definite proof of their origin as yet available. It appears that there is evidence to support the idea that they were perhaps contemporary with the Ft. Ancient Culture and may even owe their extinction to this more numerous, and dominant, though much less highly developed, people.

The Stone Grave Culture

On both sides of the Ohio River and its tributaries, in Ohio, Indiana and Kentucky, extending back from the actual river on either side, in a strip of varying width, sometimes as much as twenty miles wide, is to be found a peculiar prehistoric type of stone grave. These graves are found usually on high points or bluffs overlooking a stream or larger area of lower

land. The graves themselves are stone "cairns" are made by placing the body to be interred practically on top of the ground and covering it with large stone slabs to form a top in the form of an "A." Then other stones were placed against the first series and this process continued until a considerable area was covered.

In time surface accumulation and the action of frost caused the stones to be partially buried. Such poor protection to the skeletal remains has resulted in most cases in the entire disappearance of the bones although in a few instances enough of the skeletons have been located by the authors to show that these structures were in fact burial mounds. These stone cairns on the high ridges of the Ohio River Valley have been investigated by many and all agree that they are absolutely destitute of artifacts of any kind, a fact which has made these graves somewhat of a mystery. Most authorities agree that they represent a distinct culture. Dr. Cyrus Townsend attributed these stone graves to Shawnee or pre-Shawnee occupation but Dr. Fowke has pointed out that they differ in many important respects from the known Shawnee graves in Kentucky and Tennessee. The fact that in most cases there is no evidence of a village or dwelling site at or adjacent to these stone cairns may mean that the record of this culture is already largely lost to history.

The Iroquois

It is known that in comparatively recent historical times, probably during the seventeenth century, the powerful tribes of the Iroquois Confederacy invaded the Ohio River Valley, coming from the east where in the State of New York they have left a predominant impression upon the archaeology of a vast area. They were very fierce, were efficient as conquerors, and it is a matter of recorded history that all other tribes living in Ohio, Indiana and Kentucky either fled before the invasion or were destroyed. It might at first be thought that they would have left a marked impression on Kentucky's early history but today, although it is well known that the Iroquois met and drove out of Kentucky the tribes of the Algonquin which are known to have been numerous, yet the Iroquois left practically no trace of his occupancy. Only an occasional arrow or spear-head in the

fields, or a stone axe, reveals the fact that the Iroquois ever trod Kentucky soil. This only emphasizes the fact that a hundred years of occupation of a region by a scattered, warlike, and transient people is not long enough to have any considerable effect on the archaeological features of the area.

The Algonquin

The central portion of Kentucky along the Green River and westward was, before the Iroquois invasion, rather thickly populated by the Algonquin tribes, perhaps their chief monuments today are the great shell mounds on Green River described elsewhere in this report, where we have referred to them as the "River People." These people were largely fishermen, always living on the river. They made a fair grade of pottery, used grooved axes, very large and crude arrows, and buried in, under and about the shell mounds. They worked many different stones, making banner stones and net-spacers, and used in connection with them a characteristic hook made of deer antler. Their origin is generally thought to have been in the south and their disappearance in the same direction, if indeed they were not destroyed in Kentucky without migrating, but we are calling attention in a later chapter to the fact that there are some features of their culture which suggest relationship with northern rather than with southern tribes.

The Pre-Cherokee

The explorations of Harrington for the Haye Foundation, which were conducted chiefly on the Tennessee River between Nashville and Chattanooga in territory known to have been inhabited up to historic times by the Cherokee, has made available very accurate information as to the Cherokee culture. But it is interesting to note that the known Cherokee culture as investigated in many places by Harrington is laid down on top of a more ancient culture, denominated by him as the "Round Grave People." In this connection he says:

> "It was evident that all the burials found on this site, except the old round graves, and most of the specimens unearthed should be attributed to one people whom we finally identified as the Cherokee found in possession of this district by the whites; while from the circular graves we inferred that before the founding of the Cherokee village another people had used this point of land for burial, a people

who occasionally at least used stemmed arrowpoints. Later work, especially that on the nearby Lenoir or Bussell's island, shed further light on the culture of the 'Round Grave People' and furnished clues which point toward Algonquin influence, if not relationship."

In southern Kentucky such round graves have been found along the Cumberland River and probably represent this pre-Cherokee culture. Similar graves were found by the authors in Hines Cave in Wayne County.

A characteristic of the culture is the use of limestone hoes, the olivella shell bead and the decorated shell gorget. The culture is also characterized by a variety of stone celts and stone axes, all ungrooved. Large discoidals were used in some kind of game and occur frequently along the Cumberland River. That the culture extended as far north as Scott County seems to be proven by excavations of mounds near Stamping Ground and by the finding of a typical Cherokee decorated gorget by Mr. T. W. Singer in a small mound on his father's farm in that county.

The Western River Culture

In addition to the people responsible in central and southern Kentucky for the stone box graves which were previously mentioned, there remains yet another culture which seems to be distinct from the others which have been noted.

In the extreme western portion of the state, on the Cumberland and Tennessee Rivers, are to be found many prehistoric remains of a people who buried sometimes in stone graves but often without stone, since in that region limestone was difficult to secure. This people used a very much serrated and sharp-pointed arrow with a characteristically long stem. They made and used flint hoes in large numbers some of which were beautifully notched. Their ability to work flint reached a very high state and many of the most unusual forms of arrow-points, harpoons and knives are attributed to this people. Their pottery was of high order and beautifully decorated. The long-necked water bottle was much used by them and to this utensil they added a pottery stopper to close the small mouth of the bottle, such stoppers having been found in position in the bottles.

Since this culture has been but little studied, it has, so far as is known, received no special name. For lack of a better term this culture might be designated as that of the "River People of Western Kentucky."

Significance of Terms

After all, therefore, we can speak of neolithic man in Kentucky only in very general terms. We know that he was here; we believe that he was represented by various groups, not all of which were related, and we choose to speak of these groups as "mound-builders" or "cave-dwellers" or "cliff-dwellers" not because these names have any ethnological significance, but because they are convenient terms by which to designate the habitats of the group; we feel sure that prehistoric man occupied this region for a long period of time and that perhaps successive and overlapping cultures are represented in this ancient history; we are convinced, moreover, that there are represented in Kentucky more of these cultures than have been previously supposed. The following chapters, therefore, are devoted to a brief discussion of some of the evidence which has led us to form such conclusions.

CHAPTER V

THE MOUND BUILDERS

The name "mound-builders" is used simply to designate those people who built mounds and of course in this broad sense it is a perfectly good term. The word, however, has very little scientific significance, since we know that more than one group of ancient people built mounds; that the mounds were not all built during the same period, and that sometimes several different groups used the same mound at different times. Consequently the term "mound-builders" as commonly used, refers merely to a practice and not a distinct race or culture.

The popular notion that the mound-builders were a definite and well-known race who were quite different from the American Indian has few facts to support it. The more plausible theory seems to be that they were probably the ancestors of the Indians although perhaps so distant in ancestry that their customs and practices had little in common with those of Indians of modern tribes. However, this question is still a matter of dispute. Colonel Bennett H. Young, who assembled what was probably the finest collection of Indian relics ever secured in Kentucky, writes in his admirable report on "The Prehistoric Men of Kentucky" (Filson Club Publication No. 25: pp. 7-9) as follows:

"On this subject two opinions are held and strongly advocated; the first, that the people who constructed these remains were of different and superior race to the Indians. Those so holding contend that the remains found in the shape of mounds, teocallis (or places of worship), fortifications, implements of various kinds, indicate that these people were a race of superior culture to the Indians; that these remains point conclusively to the fact that those who constructed them were an agricultural people of sedentary habits, and lived in organized communities; that the works themselves bear evidences of mathematical and engineering knowledge which the Indian never possessed or exhibited; and that the fortifications show that these people were at war with other nations, and that in such warfare it became necessary for these Mound Builders to erect stone, wooden, and earthen defenses, and that the evidences show that these were displaced by more aggressive and war-like foes. They also insist that the Indians themselves declared that they knew nothing of the people who builded these structures, and that they were concluded ages before even the red men found them, and that they could tell nothing concerning the origin or use of these monuments.

"The second class insist that there is nothing in these monuments to indicate greater genius, greater skill or greater patience than the

American Indian has exhibited along many other lines; that it is established beyond all question that in historical times the Indians constructed mounds and fortifications, and further, that their burials are similar in most respects to those of the Mound Builders. They say that the mere fact of structures being erected for military purposes demonstrates nothing, because the different Indian nations were themselves constantly at war with each other and were known to make long marches in order to punish or destroy other Indian nations who had inflicted upon them some real or imaginary wrong. They say further, that there was scarcely a tribe from the Atlantic to the western plains that did not have some capital or fixed location in which large numbers of their people resided, and that these subsisted upon the products of agriculture. They insist that De Soto found all of the tribes he visited were successful in cultivating maize and various vegetables and that the early voyagers along the Atlantic shores found the same thing true from Florida to Massachussetts, and that John Smith and his colony depended largely for subsistence upon the products raised by the Indians. They further argue that as the Indians are the only people except the white who, so far as we of this age know, have ever held the region over which these remains were scattered, that therefore it requires proof of the most positive character to show that they were not the work of the red Indians. They contend that this proof is lacking, and that the reasonable conclusion is that they were built by the red man, or the Amercian Indian."

Thus the controversy has waged, and it would be most unscientific to assume that any theory has as yet become positively established. All that we know is merely that the mound-builders were a prehistoric people who built mounds of earth for various purposes. That these mounds were prehistoric can hardly be denied. When Ponce de Leon forced his way through the Southern swamps he encountered them; when De Soto pushed through the primeval country they were in his path; when Marquette in his bark canoes floated on the bosom of the Father of Waters he noted them on the banks; when La Salle carried his boats across the portages to the Allegheny they confronted him; when Boone reached Kentucky they were even then hoary with age and when he inquired of the Indians as to their origin they answered "Our people did not build them; they belong to a people whom our forefathers fought and drove from the territory, but whence these people came and whither they have gone, we do not know."

Kentucky is very rich in these mounds, scattered all over the State, and varying in size from almost imperceptible elevations to enormous masses of earth rising thirty or forty feet above the surrounding country. The size of the mound, of course, means very little. They were doubtless of various sizes originally and through the weathering of the years and the

changes attendant on agriculture the original shapes and sizes of most of them have been much altered. This is especially true of those mounds which were not high and which are located in what are now cultivated fields. These have been plowed over regularly and with each plowing the earth has been removed from the top and spread out at the base until the original contour has been entirely destroyed. Usually the surface of such

FIG. 35. A VICTIM OF PROGRESS.
An almost obliterated mound in Scott County on the farm of W. S. Yates.

fields for many yards around the mounds in all directions is strewn with flints, bones and pieces of broken pottery which have been dragged from the mound by plow and harrow. One of the unfortunate features of this is of course the fact that many mounds have become entirely obliterated and many more will be unrecognizable in a few more years unless steps are taken to preserve them.

A study of these mounds leads us to a number of important conclusions. First it is evident that some are much older than others and therefore were not built by contemporaneous peoples. Some were doubless constructed many years, perhaps many centuries ago; others are apparently quite recent. In fact there seems to be no doubt but that certain tribes of modern Indians, as for example the Shawnees, were constructing or at least using mounds at the time of the arrival of the first white settlers in Kentucky. Again it is evident that the same mound was used

by more than one group of people; this is plain from the intrusive burials which indicate that later tribes took advantage of the mound long after the original builders had abandoned it or had disappeared. Also it is clear that all mounds were not use for the same purpose and we conjecture that they were sometimes erected for ceremonial or sacrificial purposes, sometimes for observation or signaling, sometimes for defense, sometimes for the burial of the dead, and sometimes, perhaps, represent nothing more than the dirt roof of a tepee or the gradual accumulation of camp refuse. Mounds have been examined which seem to represent all of the above types. In excavating a mound, our practice has been to first trench the mound completely through from north to south and from east to west. This gives vertical sections and shows the nature of the soil layers, which usually consist of made earth, quite evidently brought from the surface of nearby fields, clay, charcoal and often rock. Such sectioning usually exposes enough of the interior of the mound to give the "leads" to the parts of interest. Out of the large number of mounds which we have thus investigated and regarding which we believe our field notes and photographs to be fairly complete we may mention a few illustrating the various types without going into technical details or embodying in this brief report any burdensome number of tables, figures or computations.

Observation Mounds

We occasionally find on the tops of mountains, knobs or ridges or other high elevations, mounds which upon examination prove to be made merely of earth and rocks with no indication of artifacts, fires or burials.

We assume that these mounds were used for observation or signaling since their location would seem to fit them for such a purpose and since we can discover no evidence of their having had any other use.

Sometimes these mounds are near camp-sites and sometimes there is no indication of such a site, but always the spot chosen for the mound offers a splendid view of the surrounding country and would afford an excellent lookout post or an ideal point on which to build or from which to observe signal fires or smoke-blanket semaphores.

An interesting mound of this type found in Breathitt County, near Quicksand, consisted merely of an immense heap of stones, many of which must have been carried from some distance to the top of a ridge. No artifacts were found in or near this enormous stone pile but in a neighboring valley there is undoubted evidence of a village site of considerable proportions.

FIG. 36. A CEREMONIAL MOUND.
On the Joe Reed farm, Nicholas County.

Ceremonial Mounds

Mounds which show layers of burned clay with deposits of charcoal and occasional animal bones but which contain no artifacts and no human skeletons, are believed to have been used for ceremonial purposes. Such mounds are often quite large and contain several layers of fire hardened and heat colored clay and often layers of charcoal of considerable thickness. There is no question but that they were once the scene of huge fires but their usual location, often in low valleys, preclude their use for signal fires.

Such a mound, (figure 36), about four miles south of Carlisle was 9 feet high in the center when investigated and was of an oval shape, 26 yards in diameter east by west and 16 yards north by south. This mound rested on an ash layer which averaged about four inches in thickness at the edge and more than a foot in thickness in the center. The body of the mound was

almost entirely of clay above the ash bed with a few sandstone rocks scattered through it. It contained no artifacts or bones of any kind.

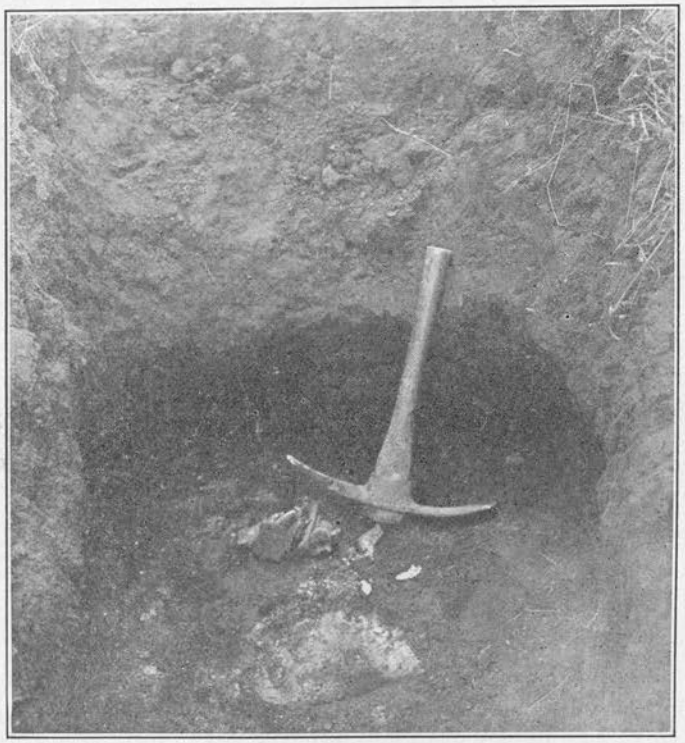


FIG 37. AN ANCIENT HEARTH.
Layer of fire-hardened clay in mound on W. S. Yates farm, Scott County.

A characteristic feature of these ceremonial mounds is the fire-hardened clay which appears in layers and shows undoubted evidences of great heat, sometimes being burned almost to brick. The lines of demarkation of these clay layers are very distinct and it is apparent that they have served as some sort of a hearth.

Usually this clay layer is covered with a layer of charcoal which often contains fragments of animal bones. These mounds show few stones, but the dirt of which they are composed sometimes contains objects which have apparently been brought in with the earth when the mound was built.

A similar mound, but one which showed a slight variation from the usual type, was excavated on the R. D. Glover farm in Christian County about five miles southwest of Trenton. This mound was nearly circular, about 200 feet in diameter and 20 feet high. A large walnut tree grew on the top.

This mound took advantage of a natural elevation and the actual depth of the made earth proved to be only 3 feet 4 inches. Eighteen inches from the top and extending in a straight line across the mound was a layer of fire hardened clay two inches thick. Ten inches below this was a four inch layer of almost pure charcoal. Near the center of the mound, beginning 2½ feet from the top and extending five feet downward was a hole four inches in diameter suggestive of a post hole but which may have been the location of the root of a tree.

While we may speculate as to the purpose of such mounds as these and conjecture as to the religious or other uses to which they may have been put, it is after all hardly more than mere speculation and it is from negative rather than from positive evidence that we judge them to have been erected for ceremonial rather than utilitarian purposes.

Fortifications

Fortifications are of various types but are often in the form of mounds or at least of elevations of earth so that they may properly be described in this chapter. When true mounds they are usually identified by the presence of a surrounding moat or ditch and by their location, generally at some strategic spot commanding the entrance to a valley, the crest of a hill or the bend of a river. We have never found artifacts or skeletons in such mounds nor any layers of clay or charcoal in their construction so we are forced to conclude that they were built merely for purposes of defense. When of other types than mounds they may be earthworks or rock barricades or simply rough piles or rock and earth but in some cases these are extremely well built and show considerable ingenuity in their structure and strategy in their locations. Probably the most interesting, well-built and extensive of such structures is that in Madison County which is described at length by Colonel Young in his chapter on "Kentucky's Largest Fort." (Prehistoric

Men of Kentucky: pp. 75-84) and recently studied and mapped by Professor Burroughs of Berea College.* In this ancient breastwork a considerable portion of the face of a cliff has been fortified by filling in natural depressions with rough masonry so that a really imposing barricade has been obtained which would make the scaling of the cliff by enemies an extremely difficult procedure. Incidentally, in this locality has been found some of the few copper articles which have been discovered in Kentucky and certain of these objects were very evidently intended to serve as parts of a crude armor for the protection of the body.

One of the best preserved of the ancient fortifications is in Fayette County about six miles northwest of Lexington on the Newtown Pike. This consists of a huge, nearly circular earthwork on the bank of Elkhorn Creek. The wall is about fifteen feet in width and some two hundred feet in diameter. Inside this embankment is a moat or ditch about ten feet deep and more than twenty feet across. Inside the moat is a mound about one hundred and fifty feet in diameter and higher, even now, than the surrounding earthwork. On the west side, the embankment is cut down to form a sort of gateway into the enclosure but the moat is no shallower at this point. The dirt from the moat has been thrown to the outside in the digging. Across the creek and stretching for some distance across the fields is the remains of a second and smaller surrounding earthwork which is now, however, almost obliterated and can barely be traced but indicates that here the dirt was thrown to the inside. The inner structures are, however, remarkably well preserved, and although the field in which it stands is in cultivation, the contours of the wall, moat and mound are plainly seen.

One of the largest of the supposedly prehistoric fortifications in the State is situated near the bank of the Ohio River just south of Fullerton. This is an immense earthwork covering many acres with well built walls and definite approaches which strongly suggest that it is the work of modern man. However, it has always been known locally as the "Indian Fort" and we can find no reference in history to its occupancy by white men.

*Geography of the Kentucky Knobs, Ky. Geol. Survvey, Series VI, Vol. XIX. 1926.

If it is truly prehistoric, it is one of the outstanding examples in Kentucky.

Other well-known and important ancient structures which are believed to represent fortifications are those on the Green River in Warren County, one known as the "O'Byam's Fort" in Hickman County, a remarkable stone barricade on the banks of Rolling Fork in Larue County, and an unusual series of earthworks in Greenup County nearly opposite the former mouth of the Scioto River. Professor Gordon Wilson of Western Teacher's College reports that in Hickman County, about five miles west of Moscow there is an ancient canal connecting Obion and Bayou du Chien creeks which is about two miles long, thirty or forty feet wide and is still from eight to fifteen feet deep. This canal runs approximately north and south and shows evidence of long, careful and continued labor. On the south end in Fulton County there are a series of mounds which were probably used in the defense of this canal. Such structures have apparently received attention from very early times. Collins in his "History of Kentucky" describes a number of these old fortifications, Colonel Young records many more, and there is hardly a writer on early Kentucky history who does not mention some of them. The present authors have made records of all that they have been able to visit but this includes only a small per cent. of the total number recorded and there are doubtless many that have never been discovered or recognized.

It is interesting to note that by far the largest number of ancient defense sites are along the rivers. They are common on both sides of the Ohio River and most of the streams within the state show similar structures. This seems to be another indication that the rivers were the chief highways for the early inhabitants of the country and it can be easily appreciated that the navigable streams would offer a far safer and more comfortable means of travel than the rough trails through the brush, cane, thickets and timber.

It seems evident, therefore, that war played no small part in the life of these early people and that as a result of their strife they had developed a system of defense in which the erec-

tion of earthworks, walls, barricades and enclosures were important.

Shelter Roofs

A type of mound which has apparently never attracted attention, or at least, so far as we can discover in the literature, has never been described, is that which suggests that it may have been the earth covered roof of a shelter which has collapsed and left only the heap of earth as evidence of its location. In a number of mounds which we have examined there seems to be indications of the remains of a framework of logs or piles beneath the earth. Generally we find on the basal level of the mound a hardened layer which might have been a floor. This floor often shows signs of a hearth or fire-place. Often, too, on this floor are discovered artifacts which might well have been used inside a tepee or lodge. Above this, and leaning in such positions as to suggest fallen walls are the undoubted remains of logs which although of course largely decomposed are sometimes recognizable as oak or walnut. The whole is entirely covered with the earth and sometimes with stones as in the case of mounds of other types.

It may not be unreasonable to suppose that shelters made of logs probably arranged in conical form with the bases far apart and the tops together, were sometimes covered with earth as a protection against the elements. Perhaps skins with flat stones to hold them in place were also used to cover the structure. Such a shelter would offer considerable protection against cold, rain and wind and would be more or less permanent. Inside fires could be built with a smoke hole at the top in the typical Indian fashion. If this sort of a structure, after abandonment and decay, finally collapsed, it would give just such a mound as we have described.

We have even found burials in these mounds but this would not invalidate the theory. It is not impossible that in severe winters when the ground was frozen, the burials might have been made in the thick soft earth of the roofs by the inhabitants themselves. Even if this were not the case, it would be probable that later tribes would take advantage of the mound after the

structure had fallen in, and use it for burials as they undoubtedly did in other kinds of mounds.

A typical mound of this sort was found in Scott County and showed the structure indicated in the following diagrams the measurements and records for which were made by Professor J. M. Davis of the Department of Mathematics of the University of Kentucky.

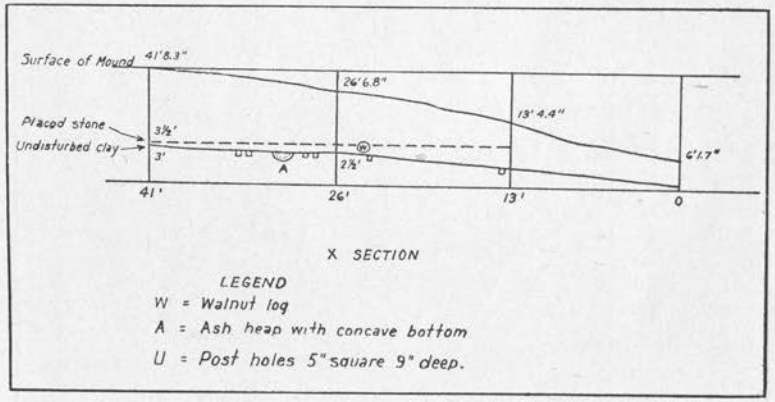


FIG. 38. A SHELTER-ROOF MOUND.
Cross section of a mound in Scott County.

This mound had a base of hard clay which might have served as a floor on which were found broken pottery, some broken artifacts, mussel shells and a few animal bones. In this floor were many post-holes, one containing the remains of posts and scattered through the mound were the fragments of walnut logs. A sloping layer of flat stones was found a few feet below the surface in all parts of the mound and a low rough wall of stone seemed to encircle the entire structure. All of this would seem to indicate the type of dwelling which we have assumed.

Occasionally these shelter-roof mounds are of a shape which would suggest the "lean-to" rather than the conical or pyramidal form of construction but in all cases the general characteristics are similar.

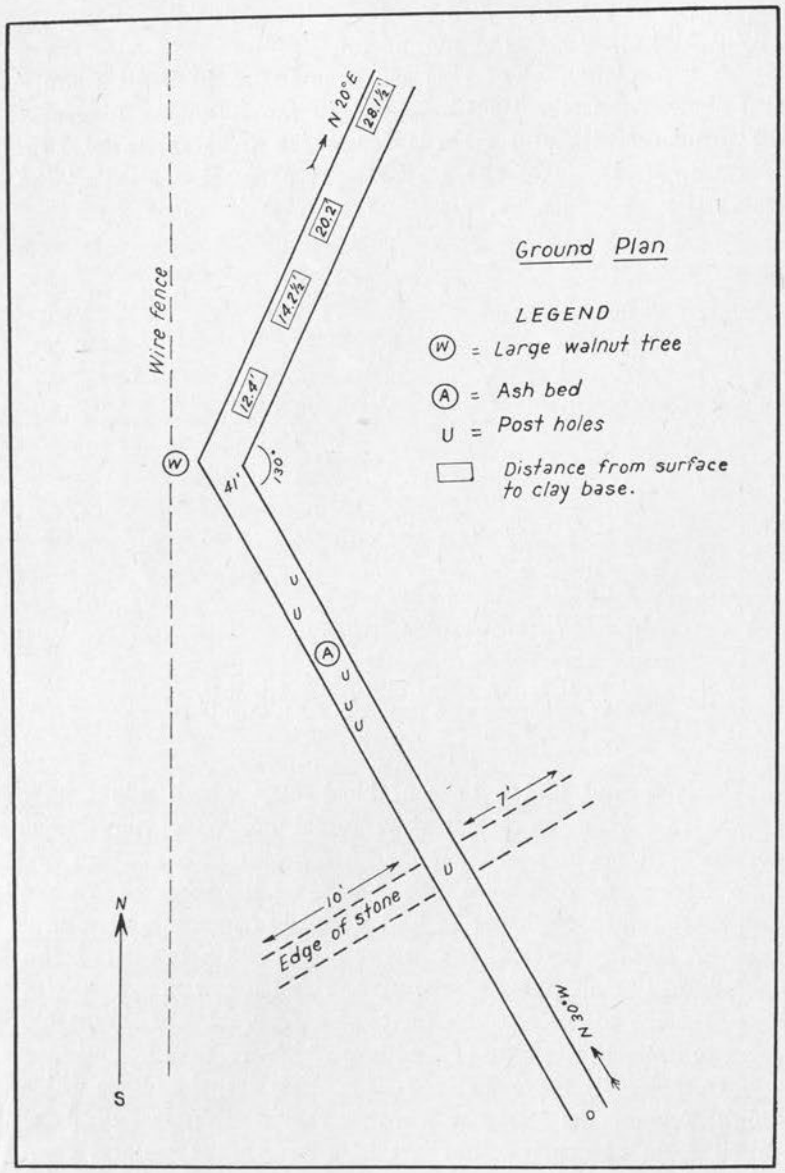


FIG. 39. SHELTER-ROOF MOUND.
Ground plan of Scott County mound.

Refuse Mounds

Many mounds which have been examined seem to be nothing more than enormous heaps of camp refuse or exaggerated kitchen-middens. Such mounds contain a great amount of discarded and broken flints, pottery and shells together with a large number of animal bones of many kinds and occasionally a human bone. Generally these mounds are so completely filled with such material that every spadeful of earth yields some evidence of the activity of man in former days and the excavation of such a mound inspires the constant hope that the next stroke of the pick or spade will yield something of interest but this hope is seldom realized. Once in a while, to be sure, a really good artifact is found, such as a stone knife or an unbroken pot. Usually these mounds contain nothing of value and the excavation is a waste of labor.

These mounds are generally on or near extensive village sites and we assume that they must represent merely the accumulation of camp debris. In some cases these mounds contain such a large quantity of broken or partly made flint artifacts that we imagine it represents the site where some workman or workmen made these objects. In fact we believe that the very large number of broken arrow-heads and other articles which are so commonly found does not represent implements broken in use or injured by accident after having been lost, but represents instead objects which were broken in the making and which were never used at all. It is easy to imagine that often when an artifact had been almost completed, a chance blow or a pressure in the wrong way would ruin the article so that it would have to be discarded. We are convinced that a few of these scrap-heaps, located near out-cropping edges of flint actually represent the site of the work-shop of some ancient arrow-maker.

Such a workshop site is located on the farm of Mat Garvin about two miles west of Rowlets in Hart County and another is on the C. A. Smith farm two miles north of Bowling Green in Warren County.

Perhaps it is merely imagination but it seems to us that it is possible in rare instances to actually recognize handiwork of an individual arrow-maker. It is not unreasonable to suppose

that in a tribe there might be some individual whose ability in that craft was superior to that of his fellows and who made most of the arrows for his tribe. Even though his arrows were not superior in construction to those of others, if for any reason they were believed to be lucky or "good medicine" they might have been in unusual demand so that at last his long practice and peculiar methods might give his product a "hall-mark" of its own. Who knows but what there may have been such a Stradivarius or a Hepplewhite devoted to the craft of fashioning flint rather than violins or furniture?

Naturally a refuse mound might be used by a later tribe as a burial mound and since in a few cases we have found skeletons close to the surface of such mounds we assume that these burials were intrusive.

In spite of the fact, however, that these refuse mounds yield very little of scientific value they are not without interest for they suggest in many striking ways much which represents the lives and habits of the early tribes. One must indeed lack imagination who, when confronted with these relics of the past, does not let his fancy picture something of the activity of the life represented. The warriors preparing for the fray, the hunters going forth to the chase, the old men sitting beside the camp fires engaged in the task of making weapons for the younger braves, the women engaged in their domestic duties, the children at play, adding to the bustle, noise and confusion of the camp or village, all have left the mute testimony of their forgotten existence in these sordid heaps of refuse.

Burial Mounds

Of all of the different types of mounds, those which invariably attract the most attention and are the subjects of most interest are the ones which contain the skeletons. These mounds are of various kinds and here again we must call attention to the fact that they were not all erected during the same period, nor by the same people and that therefore they may represent different cultures. Also that groups of different periods and of different times may be represented in a single mound, showing that after the mound had been abandoned by the original

builders, other and later tribes took advantage of its presence and used it as a convenient burial place.

On the whole, however, these mounds have much in common and a brief description of two or three which seem to be most typical will suffice to give a general idea of their construction.

FIG. 40. A BURIAL MOUND.
On S. S. Clay farm, Nicholas County.

One of the most interesting of many which the authors have investigated carefully is located on the farm of Mr. Samuel Sidney Clay on the Moorefield-Blue Lick Pike about one mile northeast of Moorefield in Nicholas County. This farm has a number of mounds and ridges which show evidences of prehistoric occupation, but the largest and the one which was most carefully examined stands in the fork of the Moorefield-Blue Lick and the Jordan pikes, and in fact the Jordan Pike was cut through one side of the mound. The farm has long been known for its abundance of "Indian relics" and has been cultivated for many years. According to the present owner it was owned by Harrison Whaley from about 1860 until 1883, by Joe Wilson during the years 1883 and 1884, by Mrs. Jim Myers from 1886 until 1892 and by Mr. Clay since 1922.

The mound when examined, was about 60 feet in diameter and five feet high but had been cultivated and plowed over for many years so that it had doubtless been considerably reduced in height. The field had been last in tobacco in 1922.

The mound was opened by means of eight radial trenches dug from circumference to center and proved to be built on a

foundation layer of hard clay. On top of the clay was a layer of ashes varying in depth from two inches to over two feet. In these ashes were found considerable charcoal, some broken pottery and a few animal bones. Above the ashes in most but not all parts of the mound were limestone rocks, mostly laid flat, some at an angle and a few on edge; these rocks were most noticeable and most abundant in a rough circle around the outer part of the mound. Above the rocks, the mound consisted of made dirt to the top and in this black dirt were scattered animal and human bones, much mussel shell, broken pottery,

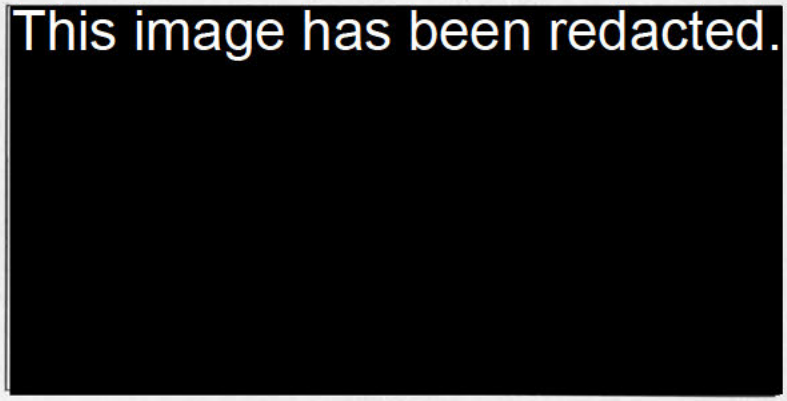


FIG. 41. PREHISTORIC SKELETONS.
Burials in the Clay Mound, Nicholas County.

complete and broken shell and bone artifacts and a very small amount of flint. About one-fourth of the distance in from the edge of the mound the clay bottom seemed to show a decided "step-up" of a foot or more in each of the trenches. This was most noticeable on the north and east sides, on which sides, also, there seemed to be the most rocks.

Fifteen skeletons were found in this mound—twelve in the made dirt and three deep in the clay. Some of those in the made dirt were very close to the surface, some were lying on the rocks above the ashbed, some were between these rocks and other rocks deeper in the ashes.

At the risk of boring the reader with details we may quote a few excerpts from our field notes which have to do with these

skeletons and might be of interest. In regard to some of the references in these notes it should be explained that the authors were assisted in this investigation by Honorable W. J. Curtis, an enthusiastic collector of archeological material, and that it was our practice for each worker to excavate a separate trench.

FIELD NOTES—(August 31-September 5, 1925). S. S. Clay Mound. Nicholas County. Skeletons.

No. 1. Found by Curtis. Trench 7. Old woman. Flat on back: skeleton complete except below knees. Shell beads around head.

No. 2. Found by Curtis. Trench 7. Middle-aged man. On right side with knees flexed. Right arm under body. Skeleton complete. Shell beads around head.

PHOTO BY LEWIS SCOTT

FIG. 42. A FLEXED BURIAL.
Skeleton No. 2, from the Clay Mound.

No. 3. Found by Curtis. Trench 5. Old man. Skeleton complete but badly disarranged. In sitting or slanting position with head forced down on chest. Shell beads on head. Sandstone pipe between knees. Large flint knife at side. The skull of a hawk perched on top of head and apparently part of a head dress.

No. 4. Found by Funkhouser. Trench 8. Incomplete skeleton of woman. Bones somewhat disarranged. Lying on right side with knees flexed. Shell beads around both arms. Bone beads around neck. Bone awl and one shell pendant at side.

No. 5. Found by Webb. Trench 3. Headless man. 13 shell pendants around the neck vertebrae and one shell gorget on breast.

No. 6. Found by Curtis. Trench 4. Adult skeleton almost prone. In bad shape. Pelvic bones decomposed. Head decayed. Sex uncertain. Shell beads around head. Flint knife by side.

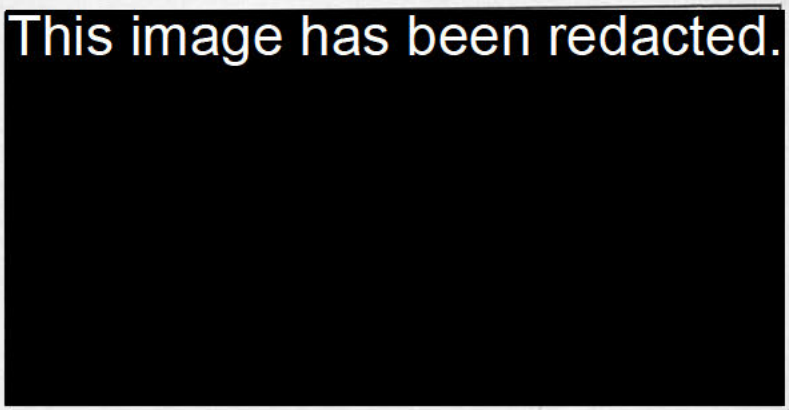


FIG. 43. A HEADLESS SKELETON.
An extended burial in the Clay Mound.

No. 7. Found by Funkhouser. Near center of mound. Complete skeleton of adult man. Skull and bones of pectoral region badly decomposed. Lower parts better. A coon-jaw pendant under body. Flint arrow-head and sandstone discoidal near hips.

No. 8. Found by Webb. Trench 3, near side. Incomplete skeleton. Head missing or decayed. Shell and bone beads around leg.

No. 9. Found by Webb. Trench 3, near center of mound. Skeleton practically complete but somewhat disarranged. Body ap-

FIG. 44. MAN WITH SHELL HEAD-DRESS.
Skeleton No. 13, from Clay Mound.

parently flat on back. Near surface. Shell and bone beads on arms and legs as well as on head and a fine shell gorget on one leg below the knee.

No. 10. Found by Curtis. Trench 3. Skeleton incomplete. In slanting position and deeply buried. Vertebrae and legs in good condition. Arms partly decomposed. Head entirely decayed.

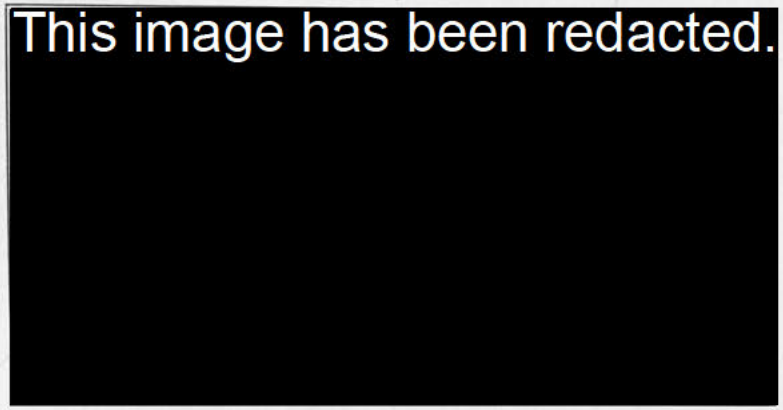


FIG. 45. MAN WITH CRUSHED SKULL.
Skeleton No. 14, from Clay Mound.

No. 11. Found by Webb. Trench 2. Practically complete. Male. Bones well preserved. Almost upright position. Leg bones extending downward deep into clay. No artifacts. Bone needle found near.

No. 12. Found by Curtis. Near center of mound. Skeleton incomplete, but evidently an adult male. Skull missing, vertebrae badly decomposed, thigh and leg bones in good shape. Shell beads and gorget on neck.

No. 13. Found by Webb. Trench 2. Near center of mound. Deepest burial in the mound. Skull six feet below surface and facing outward, other bones packed together beneath skull in disarray. Bones well preserved but in no order. Apparently a different type of burial from the others. On top of the skull a great mass of shell beads numbering many hundred which had evidently formed some kind of a cap or head-dress.

No. 14. Found by Funkhouser. Directly under skeleton No. 1. The rock which was under No. 1 rested on No. 14. Adult male. Complete skeleton. On right side with knees flexed. Face badly mashed. A shell pendant on breast and a shell ear-ornament on each side of head.

No. 15. Found by Funkhouser. Center of mound. Only a few inches below surface. Skeleton complete but bones badly decayed. Skull in fragments. Young female. Lying on right side; left arm across body; right arm under body; knees flexed. Unusually large number of shell beads on arms, wrist and neck. Beads picked up by Webb and Funkhouser; Webb alone picked up 396. Shallowest grave found.

The location of the skeletons in this mound is shown in the accompanying diagrammatic chart:

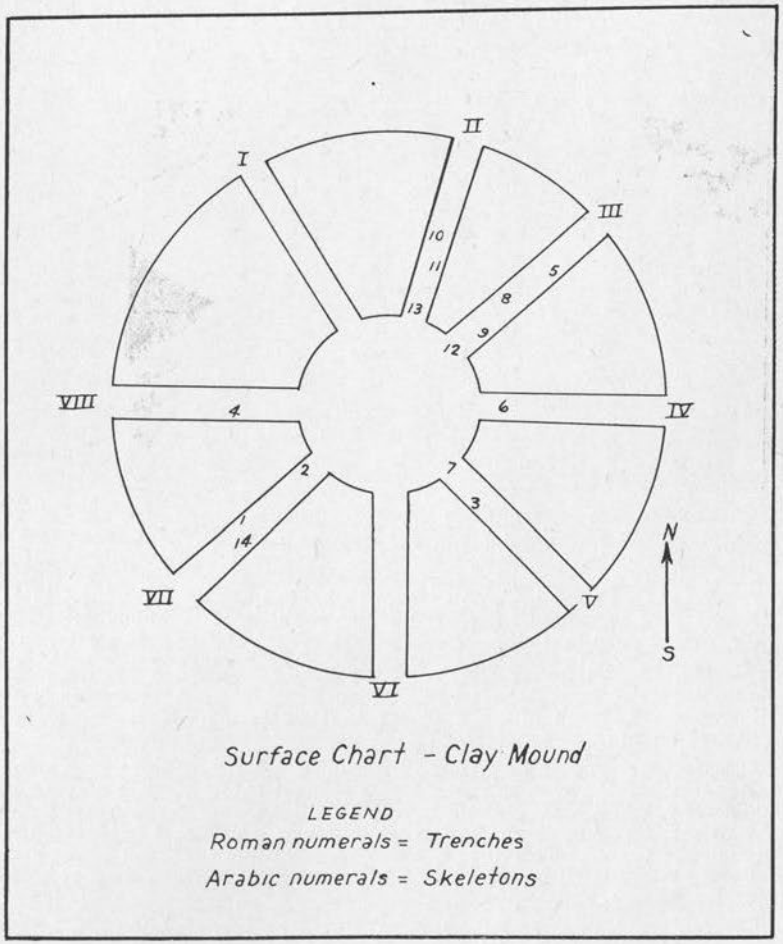


FIG. 46. SURFACE CHART OF CLAY MOUND.
Showing radial trenches and position of skeletons.

Again quoting from our field notes we may record that in this mound were found the following artifacts:

1 sandstone pipe
17 shell pendants
8 shell gorgets
Hundreds of shell beads
Numerous bone beads
2 hair ornaments
5 sandstone discoidals
25 sandstone discs
3 bone awls
5 perfect arrow-heads
Several broken arrow-heads
1 flint knife
2 bone needles
1 coon-jaw pendant
2 ear ornaments
5 horn arrow-points
35 horns from which points had been cut

In the field around the mound were picked up a number of limestone discs, a few good flints and a stone knife, while scattered over the surface of the ground were numerous pieces of mussel shell, many animal bones and a considerable amount of broken pottery. In past years various artifacts have been found in this field including a fox-head pipe found by Mr. W. A. Hudson while cultivating the field for Mr. Clay in 1922.

One of the characteristic and interesting artifacts found both in the field and in the mound was the circular disc which was very abundant. These discs were mostly made of limestone but a few were of pottery. They ranged from one to eight inches in diameter and from one-quarter of an inch to an inch in thickness. They were very crude and their use is problematical.

Of the animal bones found in the mound, many are easily recognizable and the following species are represented: deer, elk, buffalo, bear, wild turkey, coon, opossum and wild cat. Other bones, particularly those of fish and small birds could not be identified.

The mound above described is a fair sample of the burial mounds throughout the state and a description of others would vary only in the details. Some have more skeletons and others fewer; some are richer in artifacts while others are destitute of these objects; some offer perculiar positions of burial while in others the bodies are all placed in the same fashion; some show the bones in excellent condition and in others they are so badly decomposed that it is almost impossible to either identify or preserve them; in some the skeletons and artifacts are much alike but in many, perhaps in most, they vary to a considerable extent. Each new mound investigated, however, usually presents a new fact, or suggests a new problem, or helps to verify or refute some theory, or gives us some new evidence, however slight, which taken all together enables us to know more and more

about the subject which is so little known and about which we are so eager to get information.

FIG. 47. THE PERRANT MOUND.
An unusual type of burial mound in Mason County.

If the mound which has just been described represents the usual type, the one other which may be discussed in some detail represents a very unusual type and one about which we are in much doubt, for which reason we record it here. This is the mound we recently opened on the farm of Mr. Joe Perrant on the Maysville-Flemingsburg pike five miles south of Maysville. This mound is twelve feet high, ninety feet in diameter at the base with an average slope to the sides of 5¾ feet per 10 feet. It stands in a conspicuous position near the pike and has for years been a well-known land mark. The mound is constructed of made earth with the usual occasional layers of ashes and charcoal and considerable amounts of rock. A number of very large and probably very old trees originally grew upon its summit but these had been removed before we investigated it and we can therefore give no estimate as to the probable length of time which had elapsed since these trees first sprouted—a point, by the way, which is often of considerable value in estimating the age of a mound. Among a number of peculiarities which we believe makes this mound unusual may be mentioned the facts that although the season was dry and the mound stood on a well-drained elevation, the earth of which it was composed was very wet, so wet, that shoveling was a very laborious process; that although the mound was so large (the largest that we

have ever thoroughly explored) it contained only seven skeletons; that these skeletons seemed to be buried in pairs at rather regular intervals through the mound; that all of the skeletons which we found were in the center of the mound; and that each skeleton lay upon and was usually covered by a large flat stone.

The mound had been tentatively dug into at various times according to local tradition but nothing had ever been found. The diggings, however, must have been very superficial for we found no indications of previous disturbance in the soil or the roots which ran through a greater part of the upper portion. Three trenches were started into the mound but one of these was abandoned because of lack of time and of workmen, before the excavation was completed.

At the same time a well was dug straight down through the center of the mound from the top to below the hard-pan layer of yellow clay some distance below the natural level of the field. This well was 16 feet in diameter and was dug with the sides vertical and straight and all of the dirt was removed and carried outside of the mound. The two trenches were extended into the well so that altogether an enormous amount of earth was handled and examined and we believe a fair idea of the structure and content of the mound was obtained.

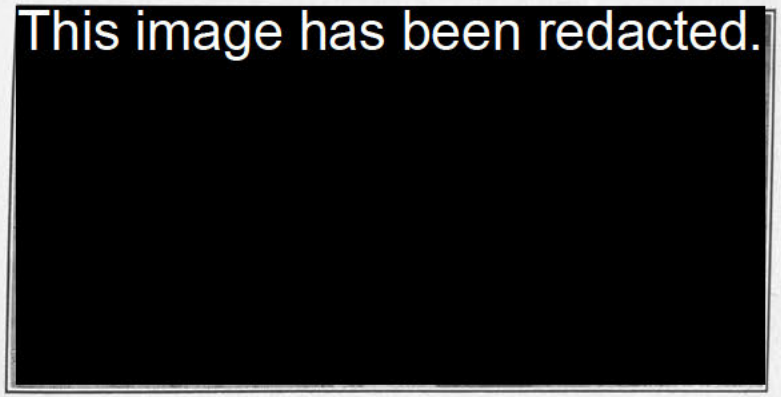


FIG. 48. A DOUBLE BURIAL.
Skeletons of a man and a woman buried side by side with rocks under and over the bodies.

Two and one-half feet below the surface in the center of the mound, two skeletons were found. These skeletons were of an

adult male and female, lying side by side on the same level, with the bodies straight and the heads toward the east. The man was on the south side of the female. No artifacts were found except a single flint arrow-head near the skeleton of the man. The curious thing about these burials, however, was the fact that each skeleton lay on a bed of stone with a stone pillow under the head and with a large flat stone over the hips and another over the feet. The bones of these skeletons were in fairly good condition since they were in a well drained portion of the mound near the surface but as work progressed the soil became more and more saturated with water until it was so wet that the bones embedded in it were entirely rotted.

Five feet below the surface two more skeletons were discovered. These again were lying side by side, about a foot apart, with the heads pointing south-east by east, but facing away from each other. Like the first pair, these were male and female, but the bones were in very bad state of preservation. Each skeleton was lying on flat rocks which were placed exactly under the head, hip, knees and feet, but in this case there were no rocks on top of the body. The bones of the right leg of the skeleton on the south had apparently been disturbed by some burrowing animal. No artifacts were found with these skeletons.

Six and one half feet below the surface at the extreme north-east side of the well, another pair of skeletons were unearthed which however were so decomposed and disturbed that a satisfactory photograph was impossible. The bodies, however, had apparently been laid in the same position as the others—prone with the heads toward the east—and the position of the flat rocks indicated that they likewise had been laid upon a stone bed and probably had stones over parts of the bodies.

The seventh skeleton, which may have been one of another pair, but on this point we could not be positive, was found at a depth of eight feet. The bones of this skeleton were entirely water-soaked and rotten and even the enamel of the teeth was crumbling. It was impossible to be sure even of the exact position of the body.

Nothing was found below this depth. The well was continued to a depth of twelve feet at which depth a hard-pan layer of yellow clay was encountered which was extremely hard

and apparently had never been disturbed. Holes were dug at various points to a depth of two feet or more into this clay but it appeared evident that it had never been moved. The earth was extremely wet to the very bottom of the mound and there was no indication as to the cause of this wet condition. This was an unusual mound, unique in our experience, and has therefore been described at some length.

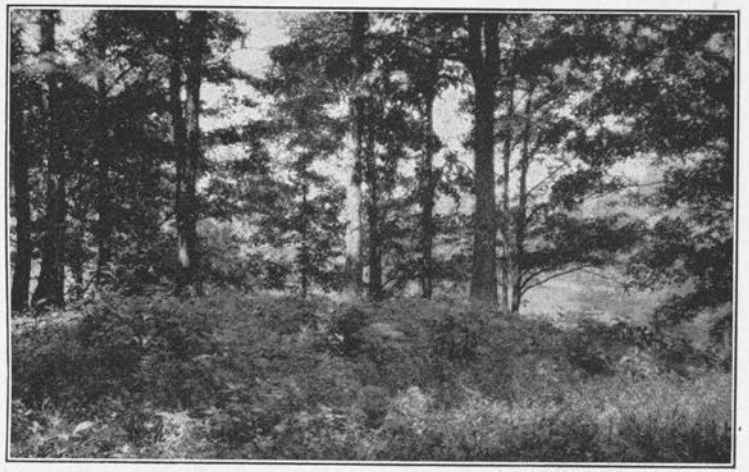


PHOTO BY MRS. TROY BACK

FIG. 49. A GRAVE BY THE RIVER.
Burial mound on Back farm, Breathitt County.

A fine example of a burial mound is located on the property of Mr. Miles Back in the village of Quicksand. This mound is on the top of a hill overlooking the Kentucky River.

Other burial mounds which we have investigated are listed in another chapter in this volume under the head of "Archaeological Survey of Kentucky" and in each a brief notation is made of the results. A detailed description of each, however, would be in many respects a repetition of experiences similar to the foregoing and can not be given space in this report. Also, many of these have been only partially examined and must be made subjects of later reports.

We have purposely refrained, also, in this discussion of burial mounds, from describing any of the artifacts found with

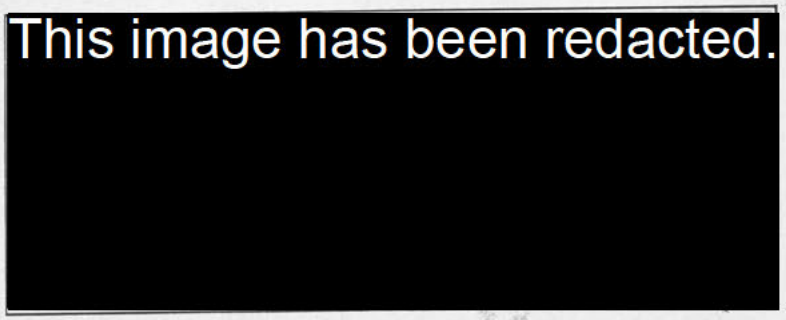


FIG. 50. FOUR TYPES OF SKULLS.
The skulls from left to right represent prehistoric types from Wayne, Mason, Hardin and Greenup Counties respectively.

the bodies since these are discussed in later chapters devoted to that subject.

It will not be out of place, however, at this point to again refer to the fact that the skeletons taken from burial mounds represent a number of quite different types. Much work is yet

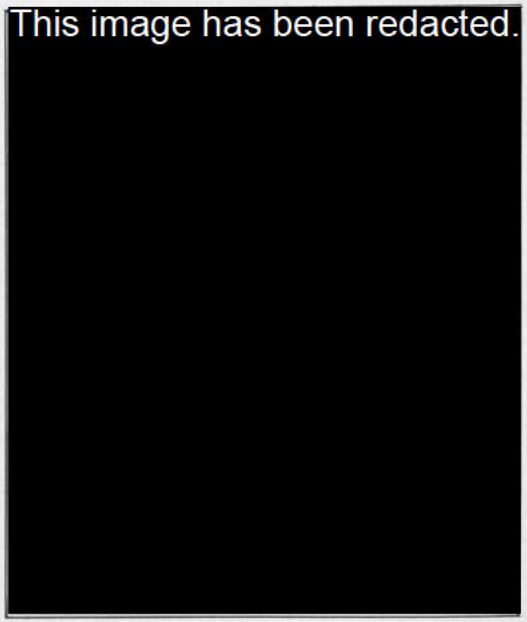


FIG. 51. PIERCED BY AN ARROW.
A skull from Greenup County showing partially healed wound.

to be done in the making of cranial measurements and in the further study particularly of the skulls, but a few may be figured which will show even without giving the measurements or commenting on the cranial peculiarities, how diversified a series of individuals we are dealing with. Figure 50 represents skulls respectively from Wayne, Mason, Hardin and Greenup

FIG 52. A TWISTED FACE.
Deformed skull from Harlan County.

Counties and it does not require a technical knowledge of ethnology to recognize the fact that they must represent individuals that in life would have been very different in personal appearance.

In addition to these apparently normal although greatly variable skulls we have found a number which show mutilation and deformities. Of the first may be mentioned especially a skull, the skeleton of which was exhumed in Greenup County, in which a deep fracture has apparently started to heal and the

new growth may be seen extending inward from the edges of the wound. It would be interesting to know how long the individual lived after such an injury, which suggests that it was caused by a blow from a battle-axe or tomahawk, and how long it took the new bone to form.

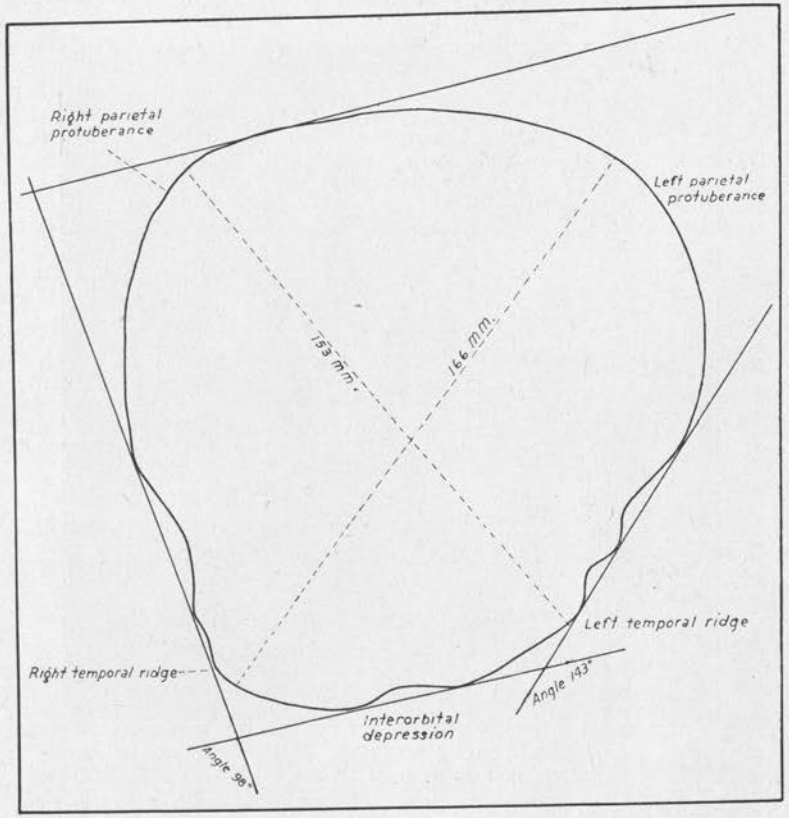


FIG. 53. A DEFORMED HEAD.
Outline and measurements of an asymmetrical skull.

Examples of deformities are very numerous and are sometimes of such a nature that it is difficult to arrive at a satisfactory explanation of their cause. One of the first of these to attract our attention was secured in Harlan County. It was so badly twisted out of shape, as is shown in the accompanying photograph, that the actual contour and technical measurements as drawn and measured by Doctor Hellman, of the American Museum of Natural History, to whom we are greatly indebted for examining this specimen, may be of interest.

A single skull of such a type would suggest merely that we had to deal with an unusual deformed individual. But when in the course of our work we found a very large number of such skulls, it was evident that this was more than a rare case of deformity. We have now secured about thirty specimens showing this asymmetrical shape and are forced to conclude that it has a deeper significance especially when we find many of them together in a single site. More than a dozen skulls showing this deformity were taken from Fox Fields in Mason County; three were secured from the Fullerton Field in Greenup County; others have been found here and there over the state and Doctor Wissler of the American Museum advised us that the collection of that museum contains several similar skulls from Kentucky.

In some cases the deformity is very strongly marked, the skull bulging out very greatly on one side or the other of the median line so that the entire face is badly twisted (see frontispiece) while in others it is less prominent. In most cases the bulging portion is on the left side but occasionally we find it on the right.

A satisfactory explanation of such a skull condition is not easy to postulate. We can think of at least six theories which might be presented but none of them are entirely acceptable. It might be suggested that the skulls were pressed out of shape after burial by the weight of the rocks and earth above them, but a fully ossified adult skull could hardly be so affected since the bone would break rather than bend or twist. Again we might assume that the condition was congenital but we can hardly accept such a theory in the light of our modern knowledge of heredity. We could assume that such a malformation might be the result of a disease, such as rickets, in early youth, which would permanently twist the features out of shape, but this theory is not supported by any other evidence and although we have carefully examined the ribs of the skeletons we can find none that are nodulate nor do we find any signs of other pathological condition.

Such malformations might have been caused by peculiar practices in midwifery or the use of crude obstetrical instruments. Also the practice of carrying the child in a certain position or the requirements of a certain posture in nursing might affect the soft skull of an infant, but it can hardly be believed that the deformation from such causes would be as great as exists. The only other explanation which seems reasonable is that the malformation was the result of a deliberate attempt to change the appearance of the individual by binding the head of the child and thus carry out some traditional practice for superstitious or religious reasons. We know that the so-called "flat-head" Indians did this sort of thing and the Aztecs seem to have practiced similar customs, so this explanation is not

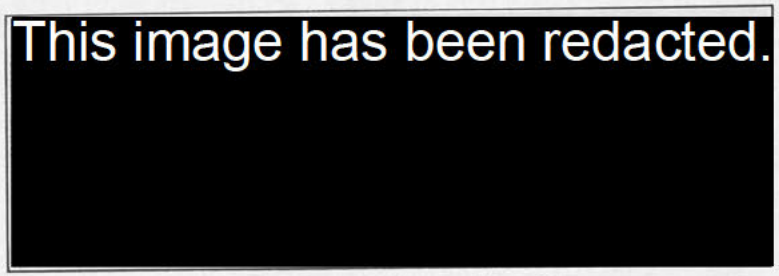


FIG. 54. PREHISTORIC SURGERY.
A human tibia which has been broken and set by primitive methods.

entirely unreasonable but if this were true we cannot understand what type of binding could have produced the bilateral asymmetry which results. It would indeed have taken a remarkable type of bandage to have produced a pressure strong enough and continued enough to bring the bones to the position which they assume in these skulls.

Other types of deformities besides those of the skull are not unusual but do not show any such uniformity as those of the skulls and are probably no different from those to be found in an average population of any race.

Mutilations are common, particularly those due to injury or accident. Occasionally we see evidence of attempts at crude surgery as in the case of the setting of bones. The tibia here figured which had been broken and afterwards healed, would indicate a piece of surgery not at all bad for such early times.

Attempts have been made to definitely classify the prehistoric groups on the basis of skull indices and while in a general way such a classification may hold, it is very likely that there were to be found in any group variations of many types just as such variations are common to most of the modern races.

We believe that we are finding a difference in the cross-section of the tibia which may be worth further study as a possible character in identification but not enough work has as yet been done in this study to warrant the stating of any conclusions.

On the whole the structural characters of the skeletons of the mound-builders are so similar to those of the Modern Indian that we can lay down no fixed rule which will differentiate them, if indeed there is any differentiation to be made. This subject, however, is one which offers a field for extended research and with the amount of material easily obtainable, such study should receive attention.

Burial Fields

All burials, of course, are not in mounds, and there are many graves in fields in which there are no indications of mounds. Whether these graves were originally mounded and have since been leveled or not, we do not know, but in many instances it seems almost certain that this was not the case.

In the now famous "Fox Field" most of the graves are on what is now comparatively level ground although there were and still are mounds in the immediate vicinity. This site, located about ten miles southwest of Maysville in Mason County, was first thoroughly investigated by Mr. Harlan I. Smith for the American Museum in 1895. Mr. Smith concluded (Smith, H. I. 1910) that the material culture of the site resembled that of the Adena Mound, Baum and Gartner Sites and the Fort Ancient and Madisonville Sites in Ohio, and assigned the Fox Field to the Fort Ancient culture as described by Mills although he agreed with Morehead that the Fort Ancient culture at that time had not been defintely placed.

Since the excavation in 1895 the site has been ploughed over many times, the land being in cultivation, and graves are constantly being opened by the plow since each year, due to the washing away of the soil, the skeletons are nearer the surface. Consequently the field has long been of interest to local col-

lectors of Indian artifacts and the surface is searched each season when the land is free from growing crops, always yielding to the industrious seekers some evidence of ancient occupation.

So numerous are the burials here that after each plowing the earth is literally covered with bleaching bones and in fact it is locally known as "Bony Field." The graves all seem to be marked by stones at least at the head and feet and our method of locating them was to follow the plow and watch for the stones upturned in the process of cultivation. The graves here were mostly close to the surface although we do not know that this was the original depth. In this field some conditions prevailed which are rather common to most of the burial fields which we have examined but which are not easily explained. One of these is the common occurrence of graves in which several skeletons are found in one grave, one of them being in good condition and in a natural position while the others are badly broken and much disarranged. There is a tradition that certain early tribes sacrificed the wives and children of the deceased and performed a funeral dance on their bodies before burying them in one grave. Such a practice might account for the condition of the skeletons in these multiple graves but would perhaps be rather fanciful. A more plausible explanation would seem to be that there were later intrusive burials and that when a body was buried in an old grave, the older skeletons were trampled down and forced aside to make room for the new occupant of the tomb.

Another is the presence of only partial skeletons in graves. This occurs so often that the absence of parts can not be explained entirely by the action of burrowing animals or the natural decomposition of the bones. Also it is not uncommon to find parts, but only parts of more than one skeleton in the same grave. We can account for this only by assuming not only later burials but the actual moving of skeletons from time to time with the attendant loss of parts.

Again, in the Fox Fields, as in other burial fields we find bodies in such unusual and grotesque positions as to suggest that they were simply thrown into the graves without the least attempt at regularity. Some appear to have been forced into graves which were much too small for the bodies with the resultant mixing of unrelated bones of the skeleton. In fact we are inclined to feel that we must not place too much reliance on the position of the body as indicative of ceremonial rites. It has been claimed, in support of such an idea, that most of the skeletons which have been reported to have been in a "sitting position" were not really buried in that position at all.

It was in Fox Field that the interesting Maltese Cross design was found by W. J. Curtis, which was recently reported by one of the present authors (Webb, W. S., 1927) as follows:

"In a grave containing three skeletons in a fair state of preservation, lying parallel and extended on their backs, there was found immediately under the lower jaw of one of them two teeth of the black bear, drilled so as to receive a large string of thong. From this position it was clear that the teeth had been suspended about the neck of the skeleton.

"These teeth have been ground down to a flat surface on each side, showing the expenditure of very considerable effort to reshape to such a degree such very hard material. The most interesting feature of these teeth, however, is that upon each tooth is engraved in deeply incised lines a Maltese cross, which is fairly symmetric and the same size on each tooth. These crosses are the same in length and breadth, and similarly placed on each tooth as shown by Figure 55. These teeth are the same size, and differ only in that one is a right and the other a left tooth, possibly of the same animal.

"The tooth in No. 2 is in a somewhat better state of preservation than that in No. 1. In this tooth a part of the outside shell has scaled off, removing a part of the engraved cross, but fortunately leaving quite a sufficient portion to make it certain that the aboriginal maker intended to make duplicate engravings of a Maltese cross as nearly similar in size, position, and orientation as it was possible for him to do. The fact that two teeth should have been found which possess duplicate engravings seems to preclude the possibilities that an individual Indian might have stumbled on this geometric form in a single attempt to decorate or beautify his ornaments. The figures are so well wrought, by boldly incised lines, which stop exactly at the corners (in no place do intersecting lines pass the point of intersection) that one is forced to conclude that the original engraver had exactly in mind the figures he desired to inscribe. In fact it seems plausible that he may even have had a copy before him.

"That the figures cut in this very hard material are excellent representations of the Maltese cross there can be no doubt.

"This discovery naturally raised the question, when were the crosses drawn? Did the prehistoric dweller on Fox Field originate these figures? If not, where did he get his idea, his copy? Was this an individual case or could any other evidence be found that this ancient and historical geometrical form was known to the prehistoric dwellers on Fox Field?

"In the private collection of one of the authors there were several hundred objects of stone, bone and shell which had previously come from Fox Field through the kindness of Hon. W. J. Curtis, the records of which had been very carefully kept. This material was, at the time of the discovery of the incision upon the teeth, packed in storage in the process of being moved to a new location. Only recently has it been unpacked and made available for investigation. This material

was carefully searched for possible additional traces of the Maltese cross with the very interesting result that a flat shell gorget (See No. 3) two inches in diameter, which had been drilled with two holes for suspension was found to have on its front face a well carved Maltese cross. This gorget was taken from the breast of a skeleton found in a grave on Fox Field in the spring of 1917, which contained no other ornaments and only one implement, a beautiful flint knife some five inches long, by two and a half inches wide, finely chipped.

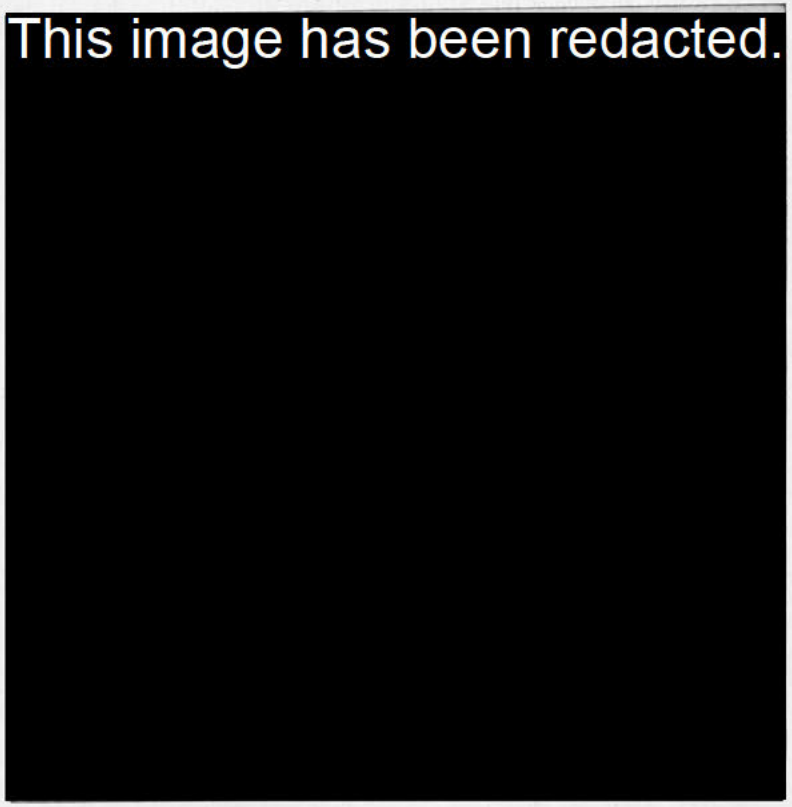


FIG. 55. MALTESE CROSS DECORATIONS.
Bear's teeth and gorget from Fox Field.

"This gorget, like any other shell material, has become encrusted with iron oxide from the soil, which slightly obscures the engraving on it.

"The cross had escaped previous attention, doubtless because it was circumscribed by a circle concentric with another circle almost twice the diameter of the first, and appears at first glance to be a part of a larger design. By comparison, however, with the designs on the bear's teeth it is quite apparent that here too there is an attempt on

this shell gorget to engrave a Maltese cross, and that the remaining portion of the design is merely a decoration forming a background for the cross.

"Another interesting feature may be noted that on a tooth there are some twenty-two conical pits, evidently reamed out by rotating a fairly sharp-pointed instrument against the tooth. Only one of the two teeth shows these pits.

"It is further interesting to note that on the shell gorget these same conical pits appear to the number of nineteen. There were probably more of them, but due to the loss of part of the original surface of the gorget and the covering of oxide only nineteen pits are now identifiable. The location of these pits on tooth and gorget, relative to the crosses, is shown in No. 4.

"What these pits may mean, is suggested later. It is interesting to find them not only on the bear's tooth that has the cross but also on the gorget having the cross. On fifteen other shell gorgets, large or small, from Fox Field and some fifty other bears' teeth from the same site there are no other crosses and no similar pits.

"The very interesting problem is thus presented: Why the cross? That here is a real Maltese cross is beyond question. That these were taken from the breast and neck of skeletons found buried in Fox Field is a matter of personal knowledge to the writer. How can the presence of this historic figure be explained? The possibility that it could have originated with the primitive prehistoric men of Fox Field and been so valued by them as to have been copied by more than one individual on his ornaments and personal decorations seems barred.

"It also seems highly improbable that the Indian could have gotten the design of the Maltese cross from any contact with either the early English or French explorers, by whom this symbol was not used.

"It is well established that the early explorers and settlers of the Ohio River Valley in Kentucky had no knowledge of any Indian occupation at Fox Field. Such occupation had ceased so long before the first French or English explorers came to Kentucky as to leave no noticeable trace to attract any attention whatever, except in the mounds explored by Mr. Smith.

"It would seem, however, quite within the bounds of possibilities that contact with the early Spanish explorers in Mexico and Florida in the early part of the sixteenth century might reasonably account for the presence of the Maltese cross. The Knights of Malta, hardy soldiers and adventurers, may well have formed a part of some Spanish party of explorers in Florida or Mexico, which could have had, with comparative ease, contact with the dwellers on Fox Field. This site is only ten miles from Maysville on the banks of the Ohio River, and it is well known that the river was the highway of travel for war parties and trade, such as existed in prehistoric days. The fact that the dwellers on Fox Field did have contact with the sea, either by trade or travel, is proven by the abundance of shell gorgets and beads made from marine shells.

"If the possibility be admitted that the inhabitants of this site could have had contact with the Spaniards by going down the Ohio or Mississippi River to the Gulf, the presence of the cross on the ornament is easily explained. To a primitive people giving great veneration to signs, charms and tokens, what could have been more impressive than the Maltese cross on pennon, breast plate or sword hilt of some Knight of Malta, who in company with a Spanish party, either as friends or enemies of the Indian, may have proved invulnerable to the arrows of the Indians because of his armor. Such prowess in battle would by a primitive people be attributed to the effects of some charm or symbol as a very potent 'medicine.'

"What more natural than that some symbol should be adopted as his own by primitive man, and to make the influence effective, he might carry it on his necklace of bear teeth or on a shell gorget suspended over his breast.

"While this explanation is highly fanciful it, does offer a plausible explanation of the occurrence of this ancient and historic symbol on the ornament and object of veneration of the prehistoric dweller of Fox Field.

"It is possibly idle to speculate further as to the significance of the engravings on these ornaments. However these suggestions are ventured as seeming possibilities:

(1) "That the Indian who drew these crosses on his ornaments actually had before him a Maltese cross on some war material, as shield or armor, taken from some Spanish Knight.

(2) "That after the customs of heraldry, such shield or armor had other engravings, or 'quarterings' on it as well as the Maltese cross.

(3) "That the groups of conical pits and circles associated with these drawings of crosses represent the attempt of the Indian to copy the 'charmed' device exactly as he saw it, to the best of his ability.

"If this possibility be admitted, it would seem reasonable to suppose that burials took place in Fox Field at such a late date that it was possible for the deceased to have had contact with Spanish explorers, such as Cortez in Mexico in 1519 or De Soto in Florida and Mississippi in 1540. Possibly burials may have occurred at Fox Field as late as the last quarter of the sixteenth century.

"Professor Mills points out that inhabitants of the Gartner Village which is about seventy miles north of Fox Field had a characteristic ornament made from shells in the form of a crescent. No. 5 shows two small shell crescents taken from two graves on Fox Field. These specimens seem to be somewhat larger, and better preserved, than those reported by Smith in 1910.

"In conclusion, if this suggestion as to the age of Fox Field be accepted, it seems reasonable to attribute to the Gartner Site and to all of the Ft. Ancient culture no very great antiquity. That is, these similar and related sites may possibly have been inhabited as late as through the sixteenth century."

One of the most interesting of the burial fields in Kentucky is the "Fullerton Field" which was discovered in 1926 as a result of excavations for a street in a new subdivision at Fullerton in Greenup County. A number of features of this field warrant its description in some detail.

Opposite Portsmouth, Ohio, on the Kentucky side of the Ohio River, is the small village of South Portsmouth. Immediately adjacent thereto on the east is the small village of Fullerton, which is in part built on the now exposed portion of the ancient river bed of the Ohio River. The town sites of South Portsmouth and Fullerton form a continuous strip of populated territory, extending perhaps three miles along the river. This strip varies in width from 400 to 100 feet, and

terminates to the southward abruptly in the almost vertical cliffs which rise 300 feet or more from the level of the river. East of Fullerton the ancient river bed widens out to about 5,000 feet from the present river bed to the river cliffs to the southward.

This level tract is bounded on the east by Tygart Creek, a fairly large creek flowing swiftly between steep banks, 50 feet or more high, to empty a yellow stream of generally very muddy water into the Ohio River not far from the Ohio village of South Boston. The main road from the ferries at Portsmouth, Ohio, on the Kentucky side runs along the foot of the river cliff eastward to Greenup, crossing Tygart Creek over an iron bridge. On the north side of this road, and along the west bank of Tygart Creek, Mr. A. T. Pack of South Portsmouth, Kentucky, had purchased a tract of some five acres, and had undertaken to develop the subdivision called Fullerton Heights.

Indianola Avenue was being constructed from the present Fullerton-Greenup Road at the foot of the river cliff northward to meet the proposed new state road over Tygart Creek, a distance of some 1,100 feet. In building this street it was necessary to excavate a strip some 50 feet wide to a depth varying from two to six feet. Before excavation for this street began it was not known that this was a prehistoric village site. A resident of an adjoining property stated, however, that several years before, when excavating for a cellar for his home, he had discovered two skeletons very old and apparently folded up. This area on which the new town site was laid out had for several years previously been cultivated as a corn field, the top soil being a black, sandy loam, doubtless very fertile. Upon inquiry, the former owner stated that workmen had repeatedly plowed up bones in this field, some of which had been thought to be human, but little or no attention had been paid to such chance findings. There seemed to be no history of the findings of any especially interesting or unusual artifacts.

It was quite apparent, however, from a superficial inspection of the surface of this field, that there was every reason to believe that here was an ancient village site. The black loam was full of flint chips, broken pottery, mussel shells, and one had but to remove some six to nine inches of the top soil to

discover a variety of animal bones of deer, bear, wolf, together with bones of fish and birds. It was further apparent that on this site there had been at least two mounds, somewhat elliptical in form, and probably 100 feet in diameter, situated as shown in Figure 56. It was difficult, if not impossible, to estimate the original height of these mounds, as the original surface of this "old river flat," as this area was called by the local inhabitants, was evidently slightly rolling in topography, and the

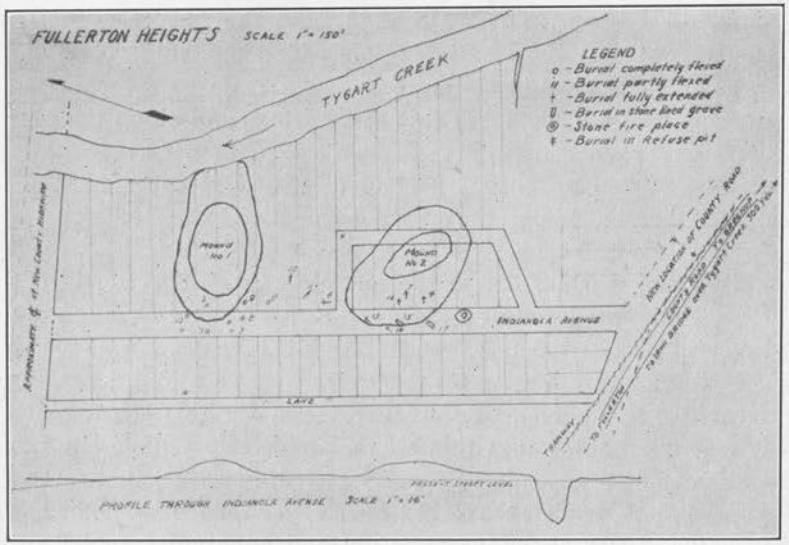


FIG. 56. FULLERTON FIELD.
Surface and profile sketches showing location of principal mounds and graves.

makers of each of these two mounds seemed to have taken advantage in each case of a natural ridge, which was perhaps two to four feet higher than the surrounding territory on which to build these mounds. Again, the continued cultivation had evidently greatly reduced the height of the mounds and spread them over a larger area than they originally occupied. When first visited the top of Mound No. 1 was 6 feet, and that of No. 2, about 4 feet higher than the general level of the soil of the cultivated field.

Before the authors reached this site, excavation had been going on along Indianola Avenue, and a strip some 30 feet

wide along the western side of this street had been brought down to grade for a distance of about 300 feet on the northern end of this street. The excavation was carried on by some fourteen teams with drag scrapers, scooping up the soil and carrying it to the vicinity of the Fullerton Road, there to dump it into several gullies which were being filled. It was quite evident that by this method the chance of finding a burial undisturbed was small. The task, however, was not an impossible one. The first 12 to 18 inches of soil was coal black in color. This layer of top soil rested on a very beautifully clear yellow river sand, which in the undisturbed state was uniform in composition and free even of river gravel.

Where this original yellow sand had been disturbed by ancient man, there were traces of the mingling of the black top soil which showed quite plainly. As the scrapers passed over the sand floor, when they showed black soil mixed with sand such signs always led to the finding of graves or other evidence of prehistoric occupation. Through the kindness of the owner, Mr. A. T. Pack, the workmen were instructed that if any signs were discovered which rendered time to investigate, the procession of scrapers was to be diverted to another tract, thus giving opportunity for a careful inspection. But for this courtesy and the general assistance of the workmen it would have been impossible by such rapid movement of earth to obtain any worth-while data.

Shortly following the beginning of the excavation Mr. Lucian Beckner was sent to make an examination and a collection, if possible, for the Kentucky Geological Survey. He visited the site at once, and as a result of the kindness and cooperation of Mr. Pack was able to recover a number of skeletons, some of which he carefully preserved and shipped to the Survey headquarters at Frankfort, Kentucky. These burials were located in the general vicinity of Mound No. 1, in the northern end of Indianola Avenue, and were all of the fully flexed type. He reports[1] the first artifacts, though few, buried with these bodies, a few simple ones found scattered through the soil, together with much broken pottery,

[1] Beckner, Lucien. Ky. Geol. Survey, Vol. XXVI, pp. 261-272, 1927.

a number of arrow points, and one drilled bear's tooth. He has presented data as to the location of these burials.

Excavations were continued for a period of some six weeks, the work being frequently interrupted by repeated rains, and during most of this period the soil was so full of water as to greatly hinder careful investigations by individual excavations. During some three weeks on this field it was possible to carefully investigate some seventeen burials as well as to superficially inspect or collect data on some sixteen other burials which had previously been explored by others, or destroyed in the process of excavation.

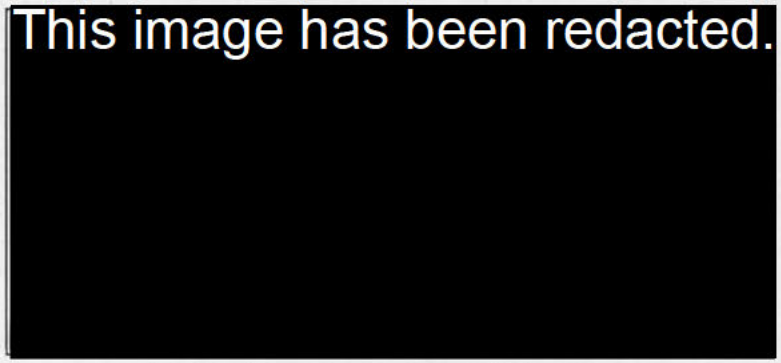


FIG. 57. THE COMPLETELY FLEXED TYPE.
A burial in the Fullerton Field showing legs and arms closely flexed.

In general the burials may be, for the purpose of description only, divided into four classes: the type most commonly found is well represented by burial No. 5, for convenience called the "completely flexed type." Nine of these were investigated by the authors. Several more were found by Mr. Beckner, and three others reported by workmen as having been scooped up and carried over the dump. All these burials were single interments, in no case was there found a suggestion of a double burial. These completely flexed burials seemed to have no regularity as to orientation, being sometimes on the right side, sometimes on the left side, and often on the back, and with heads pointing to all points of the compass. The knees were always drawn well up to the body, with arms usually folded so that the

hands came up about the face. These burials were always on or in the naturally yellow sand, at depths varying from 18 inches to 4½ feet. No trace could be found of any attempt to prepare a grave or do any more than dig a hole in the sand. The skeletons of this type were fairly well preserved. These graves were completely destitute of artifacts, not even a bead or a bit of broken pottery being found. When it became apparent that relics were very scarce with this type of burial, extra care was used to be sure that nothing from these graves was overlooked. As day after day went by with only skeletons revealed, the ever present "village wag," who viewed the work

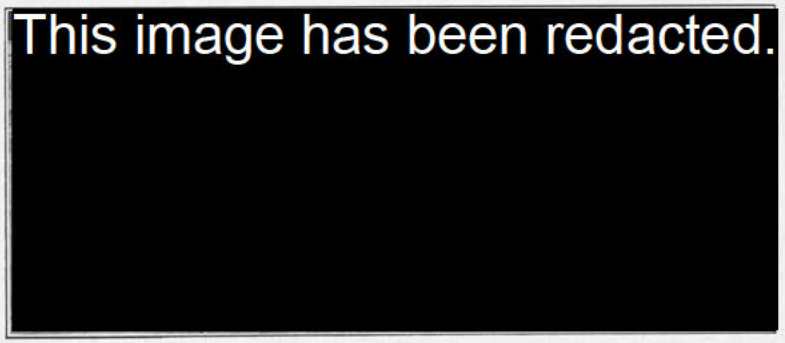


FIG. 58. THE PARTLY FLEXED TYPE.
Showing legs and arms only partly flexed.

from a comfortable seat on the bank, and whose curiosity was still unsatisfied, gave vent to his disappointment by stating that "he allowed these here Indians were Democrats and had nothing." At any rate nine such burials, the location of which is shown in Fig. 56, yielded nothing which could be identified as having been placed with them at the time of interment. It is to be noted that all of these burials were found near the northern end of Indianola Avenue, and appear from a superficial study to be quite similar to burials described by Mills in Ohio Archaeologial Reports, Vol. III, as coming from Fuert Village site. In most cases it was possible to remove the skeletons completely, and with careful packing they arrived at the Department of Zoology, at the University of Kentucky, in fair condition.

A second type of burial is represented by a single skeleton, burial No. 9; this body was laid head to the west, slightly on the left side on or in a bed of hard clay, foreign to the natural river sand. The clay for this bed had evidently been brought from elsewhere, and placed on the sand and formed into a hollow bowl-like form. The body was partly flexed, and had accompanying it a large piece of broken pottery and two bone awls, shown in place. The skull in this case resting on a relatively hard surface had, for some reason, not become infiltrated with sand, and had been crushed by the weight of the superincumbent earth.

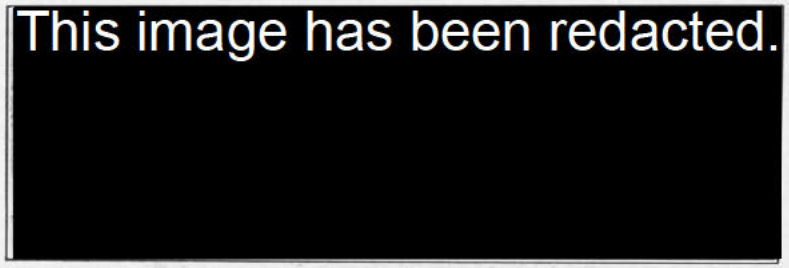


FIG. 59. THE FULLY EXTENDED TYPE.
A Fullerton Field skeleton with legs and arms straight.

A third class of burials were those that were fully extended, as illustrated in Fig. 59.

These were not found in the street until work was begun in the vicinity of Mound No. 2. The first two of these burials were discovered outside of the street excavation. These graves showed no attempt at preparation, other than to dig a hole. The exact size of the original grave in most cases could be exactly determined by the trace of dark soil mixed with yellow sand. In seven of these graves four were without artifacts of any kind. All such burials were single interments. They were all buried flat on the back, and with one exception showed evident care at the time of interment to obtain an orderly arrangement of the body, showing quite characteristically the forearms crossed on the body. The location of these graves is indicated on Fig. 56. In all cases of these extended burials sand had filtered into the skull cavity, thus aiding in supporting it. They were, therefore, in fairly good condition, although the portion of the field

in which they were located seemed to be much damper than the portion containing the completely flexed burials. Special attention should be called to four of these fully extended burials.

Burial No. 11, a fully extended adult, perhaps 30 years of age, was not accompanied by any artifacts. It seemed impossible to certainly determine the sex. During life this subject had received a severe injury to the right parietal. This injury, which is elliptical in form, about 1.25 inches long by .75 inches broad, did not cause immediate death, as is shown by the restoration of the bony tissue. Several medical friends of the authors have variously estimated the length of time necessary to produce the amount of restoration at from three to five months, the general opinion being, however, that this wound ultimately caused death. This is the skull previously figured in this chapter (Fig. 51)

Burial No. 16 was discovered about five p. m., at the close of a very rainy afternoon. The light was much too poor to hope to take a photograph of this skeleton, an adult female fully extended. It was thought unwise to leave the grave unexplored until morning, as on two former occasions where a grave had been left incompletely examined at the close of a day's work it was found rifled and all evidence destroyed by irresponsible persons of the neighborhood. Work was therefore continued in the dusk and the skeleton finally removed. This burial was accompanied by a large number of bone beads and although the skeleton was in fair condition the beads were badly decayed, the majority being only forms in the sand. Many beads were slit longitudinally into thin splinters by the decaying process. Altogether, with the greatest of care, some 115 beads were found in such condition that they could be restored.

It is to be noted that two of these beads were double drilled, so that they could have been used to receive a double cord. It would appear that some of these beads were made from large bones with thin walls, possibly the tarsometatarsus of large birds. Others appear to have been made from rib bones, as they are quite flat and bored non-symmetrically. Because of the very decayed state of these beads, the early dusk of a rainy summer day, it was impossible to discover any ordered arrangement of these beads on the skeleton as they were scattered from neck to hip. Only those which were first reached and found

somewhat removed from the skeleton could be restored. Those under the skeleton were too badly decayed to be preserved even with the greatest care.

Perhaps Burial No. 4 is the most interesting of all investigated at this site. This skeleton, an adult male, fully extended, had what appeared to be a head-dress of cut animal jaws. The jaws seemed to have been arranged in a double row, only five showing in our photograph. When the skull was lifted, a

FIG. 60. WOLF JAWS.
These jaws formed the head-dress of the old man in the Fullerton Field burial.

total of twelve were found in a condition to permit of restoration. These restored jaws are shown in Fig. 60. The jaws composing this head-dress proved to be all jaws of the wolf (*Canis occidentalis*) and in most cases upper jaws. According to the dental formula of the wolf, it appears that they were cut off just back of the last premolar. An inspection of a wolf skull makes the cutting at this place easily understandable since at this point the bone is thinnest and the maker of these ornaments by so cutting secured the maximum number of teeth for a minimum of cutting and polishing.

This skull was in poor condition for recovery as the burial was less than twenty inches from the present surface of the field. The lower jaw had been moved, perhaps by the plowing of the soil immediately above it. This was evidently a very aged individual as the lower jaw contained only a few teeth and the other cavities had been completely healed. The skull was lying on its left side.

Immediately in front of the face was the head of a large garfish which measured fourteen inches in length. The heavy downpour of rain caused both the heads to separate into the the separate bones. Between the garfish head and the skull was

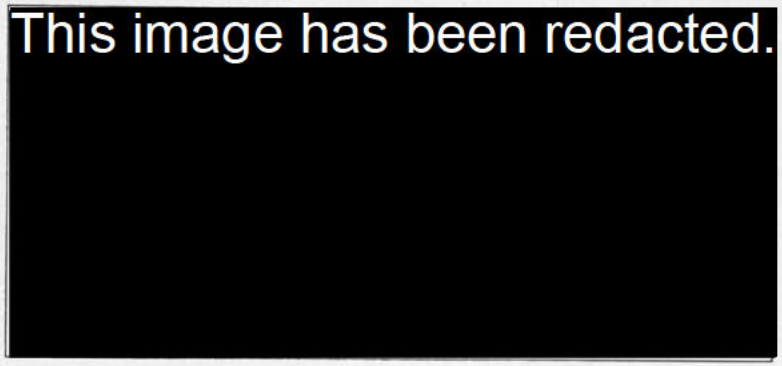


FIG. 61. A GRUESOME DECORATION.
Gorget fashioned from part of a human skull.

found the penis bone of a coon which may have been used as a pin in the head-dress as the curved end shows an attempt at pointing. On the breast of the skeleton was a small hematite celt, one inch broad by one and a half inches long, with sharp edge and high polish, accompanied by the bone gorget shown in Figure 61, a and b. This gorget is made from a part of a human skull. It was drilled for suspension from the interior side of the skull only, the holes meeting, being drilled from the edge of the gorget so that the front face of the gorget, which is the outer side of the skull, was left perfectly smooth. It is almost exactly circular in form, and two inches in diameter.

Burial No. 6 is of interest in that it shows a body fully extended in a hole somewhat elliptical in shape, about four by

three feet and five feet deep. The hole was much too broad for a single burial and much too short for a fully extended burial so that it would appear that it was not originally and primarily intended for a grave. The bottom of the hole was not flat, but deeper in the middle. The body had been placed with the trunk in the middle of the hole, the head much higher than the body, and the legs sloping upward at an angle of some thirty degrees Not suspecting the presence of this burial, a scraper struck the highest point of the skull and almost at the same time another scraper struck the feet at a higher elevation.

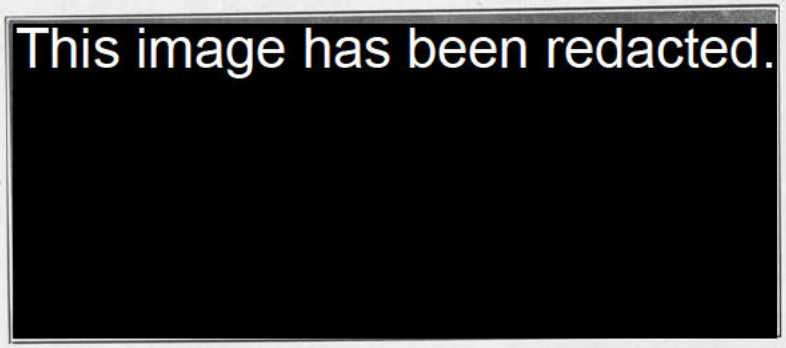


FIG. 62. A HASTY BURIAL.
Body crowded into a short grave with head and legs sloping upward.

This burial is of interest also from the fact that with the skeleton, or perhaps more accurately, in the hole, was found a mass of rubbish such as might easily have accumulated about an Indian camp site, including broken pottery, animal bones, mussel shells, deer horns, broken hammer stones, and an assortment of river pebbles of different sizes and materials most of which showed the result of hammering, together with a number of very crude stone discs from one to four inches in diameter. From the character of this material it is not to be supposed that it was placed in the grave with any intent to honor the dead, as in the case of most artifacts, but was used only to help fill up the hole. It would be fair to assume that this hole, after receiving the body, had been filled with rubbish and camp debris of whatever kind might have been available at the time.

In burial No. 13, a fully extended adult, nothing was found in addition to the skeleton save what appeared to be part of a

bear's skull. This fragment of skull was broken into quite a number of small pieces and was not thought to be of any particular interest; however it was saved for further investigation. After being cleaned, an attempt was made at restoration and we were pleasantly surprised to find the pieces fitting together to form a bone gorget which had been cut from the upper jaw of a bear. After having been cut from the skull just back of the third premolar, the whole bone had been ground down to a flat surface parallel to the roof of the mouth, leaving the teeth to project from the bone.

FIG. 63. A BEAR-SKULL GORGET.
a. Dorsal view. b. Ventral view.

This bear gorget as shown in Figure 63, a and b, has two holes drilled through the thin bone of the roof of the mouth, doubtless for suspension. It shows careful workmanship and evidently much effort was expended to grind the teeth. The large canine, as well as each of the other teeth, is ground to a flat surface. This type of gorget may explain the finding in another Kentucky site by Smith (Smith, H. I., 1910) the cut canine teeth of the bear. These cut teeth which, found separately, show no means of attachment as ornaments, have been cause of speculation by more than one writer as to the purpose of such cutting.

A fourth type of burial on this site was represented by only two graves. These were of the stone-lined, box form. The locations are shown in Figure 56. One of these graves had been almost completely destroyed before it could be investigated. It was within a foot of the surface, little of the skeleton remained and no artifacts were found. The second grave was discovered by two boys of the village who removed the flat stones from the top, shoveled out the grave, destroyed the skeleton and left only the vertical stone walls of the grave in place, after which the grave quickly filled with water. The owner of the subdivision, on learning of this discovery, stopped the boys and obtained from them a perfect pot. One boy at first admitted, but lated denied, that other artifacts had been taken from the grave. This pot is five inches in diameter at the mouth and has a capacity of nearly a quart.

An attempt was made to obtain a photograph of this grave but the water standing in it had so softened the walls that all had caved in, leaving only a pile of stones. It was evident, however, that both of these stone graves had been made by placing large slabs of sandstone on edge to outline the grave and covering the whole after burial by other flat pieces of sandstone laid horizontally. This sandstone can be found in quantity in the river cliffs only some three hundred feet distant. The top of the last grave was three feet below the surface of the field.

Some fifty feet to the south, and within the street limits, at a depth of eighteen inches, was found a circle of large river gravel, most of the stones as large as a man's head, arranged in a sort of cobble-stone pavement in a circle about ten feet in diameter. On top of this crude pavement was a quantity of ashes and charcoal mixed with earth, and the usual camp rubbish. This was evidently the site of an ancient hearth and may have marked the center of a tepee. Its location is shown in Figure 56.

The examination of the Fullerton Field was made under most unfavorable circumstances particularly as regarded the weather and it is difficult to draw definite conclusions from so hasty an investigation but it is certain that the site is worthy of more careful and complete investigation. Even with data so incomplete, however, it may be suggested that this site on

the bank of Tygart Creek, on the ancient bed of the Ohio River, was inhabited at different times by two different peoples, or at least by peoples having two distinct burial customs, as represented by the completely flexed burial with no artifacts and by the fully extended burials with artifacts.

From the distribution of the graves it would seem that Mound No. 1 was more closely associated with the flexed burials and Mound No. 2 with the extended burials but there is no conclusive evidence of priority one over the other if indeed there are two different cultures represented. The single partially flexed burial may be a lone grave of some transient people, the prepared clay bed suggesting kinship with the so-called "pre-Hopewell" culture. The two stone graves, very similar to those in many other sites in Kentucky, appear to be the most recent of all. They too may have been intrusive burials by a transient people, camping on this site at no very remote period.

A very interesting burial field was investigated on the farm of Mr. Jesse Henson in Marshall County on the Tennessee River west of Benton. This spot is known locally as "Grave Yard Ridge" for very apparent reasons. It had evidently been the practice of the people using this field to invariably cover the grave with a large flat limestone rock. But limestone does not outcrop in this region and so to carry out their practice it had been necessary to bring the stones from across the river, which must have been a laborious process. Nevertheless, such was the case and the result was that the field was so covered with these large flat stones that cultivation had been made practically impossible and the ridge had been allowed to stand in grass and was used as a pasture.

The graves, however, were not difficult to locate, since an attempt had been made to sow the field in clover, a crop that does not flourish in this part of Kentucky because of the lack of lime in the soil, with the peculiar result that the clover grew only where a rotted limestone rock just beneath the sod furnished the necessary lime for the legume. As a consequence it was much as though Nature had planted flowers on each grave to mark its location and we had only to take advantage of this to find the skeletons.

On the neighboring farm of Mr. Albert Henson were three large mounds, one of which was several acres in extent and close by on the farm of Mrs. Betty Faughn were a series of mounds on the top of a long ridge. None of these mounds contained skeletons. This would seem to indicate that these mound-builders used the fields rather than the mounds for burials.

A large number of other locations of burial fields are listed in a following chapter on the "Archaeological Survey" and a description of each of these would in most cases duplicate in the main the discussion of one or another of the foregoing. All however seem to bear out our assumption that the mound-builders often used fields for burial purposes and that if the graves in these fields were ever mounded, all evidences of such elevations have long since disappeared.

Camp and Village Sites

It is to be taken for granted that the mound builders had other things to do in addition to building mounds however important these mounds were for their peculiar purposes, and it is natural that we should find in the vicinity of mounds the remains of camp and village sites which in many cases are extensive and give evidence of long occupancy. The commonest feature of such a site is the enormous amount of litter of every sort which covers the ground over large areas and is found to a depth of several inches. Artifacts, broken pottery, mussel shells, pieces of flint, and animal bones are the most noticeable of these remains.

The trash of the kitchen-middens has usually been scattered and plowed under by the cultivation of the ground during all the years that have passed since the original deposits and in fact the very soil itself is often noticeably richer than the surrounding country because of the immense amount of organic material which it has contained. Almost every conceivable sort of object which would naturally be left in a place once teeming with primitive life may be picked up on such a site and even human bones are often scattered through the refuse. Remains of weapons from the chase or battle, fragments of cooking utensils, pieces of agricultural implements, pipes, game-stones, articles

of personal adornment—all bring to the mind's eye a picture of the busy life of the time—

"E'er the pale-faces came in their white-winged canoes from the land o'er the sun-rising sea"

to rob the true Americans of their homes and their hunting grounds.

Evidences of agriculture about these village-sites are unquestioned; signs of their fishing are undeniable along the streams; proof of their prowess in the chase is shown by the remains of many a feast; reminders of their sports by the almost obliterated race-tracks and play-grounds; suggestions of their child-like vanities by the gaudy ornaments for decoration; examples of their industry by the laboriously fashioned tools; samples of their art by the crudely carved pipes and gorgets; memorials of their loves and their joys and their sorrows by the pathetic remains of their household goods and their simple dwellings; indications of their victories by the places of sacrifice and thanksgiving; undoubtedly evidence of their final defeat by the whitened bones in their graves.

They have done their best to record for us chapters of their history if we can but interpret their writings; they have left us evidence if we can but recognize it—but many chapters are missing and much of the evidence can now be found only in

"The sluggish clod, which the rude swain turns with his share and treads upon."—Gray.

CHAPTER VI

THE CAVE DWELLERS

Probably the best evidences of prehistoric man which have ever been found are those which have been discovered in the caves of central Europe. It has been suggested that if other discoveries as valuable as these are ever made they must be sought for in some part of the world which has about the same latitude as the European sites, the localities must be about the same distance from the glacial drift, the region must have about the same climate as that of southern France and northern Spain and above all it must be some place where there are large limestone caves with southern exposures. Such a place is Kentucky. Moreover, the Kentucky caves were certainly inhabited by prehistoric man—but whether or not he dates back to the time of the Cro-Magnon is of course another question. We are, however, perfectly justified in speaking of the "cave-dwellers" of Kentucky in the same sense as that in which we spoke of the "mound-builders"—namely to designate these ancient people who commonly lived in caves and who apparently preferred that habitat to all others.

Kentucky has probably the largest and most extensive caves of any State of the Union, ranging in size from the enormous caverns such as Mammoth Cave, Crystal Cave, Onyx Cave, Colossal Cavern, Horse Cave, Grand Cave and Salts Cave in the cavernous limestone region of the state, some of which extend for miles under ground and have never been entirely explored, to the smaller caves which are found in great abundance in practically all parts of Kentucky where the limestone is close to the surface.

Most of these caves have been formed by the dissolving out of the beds of soluble limestones by underground waters, leaving a roof of some less soluble material such as sandstone. Many parts of the state are entirely honeycombed with the subterranian passages which are the explanation of the underground streams and "lost rivers" so common in many regions. Often these underground caverns have no entrance and when event-

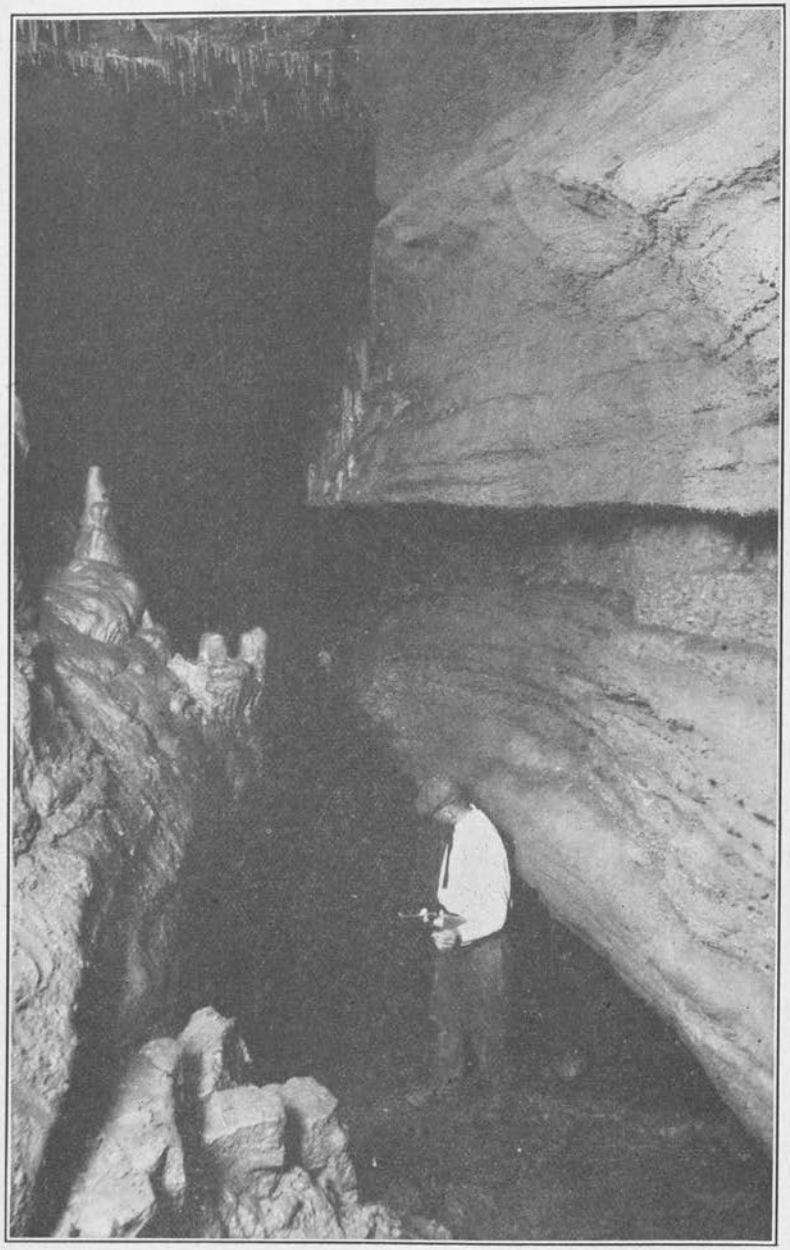


FIG. 64. IN A KENTUCKY CAVE.
Interior of a cavern in Fayette County.

ually the roof caves in, it forms the characteristic "sink-hole" on the surface.

PHOTO BY A. M. MILLER

FIG. 65. A "SINK-HOLE."
Surface depression indicating an underground cavern.

In a previous report in which this subject was discussed ("Wild Life in Kentucky" p. 23) the statement was made that:

"These caves, large and small, are and always have been the homes of animals. They are inhabited today by foxes, coons, skunks and bats, and are used as places of hibernation by snakes, lizards and hosts of other forms; in former years the bears and wolves made them their dens and dragged the carcasses of their prey into their gloomy recesses to be devoured. Today the cattle seek the cool mouths of the caves to escape the heat and flies; a hundred or more years ago the buffalo used them for the same purpose as is mutely testified by their bones. In fact the caves have a very interesting fauna of their own, consisting of blind fish, blind crickets, blind crayfish, peculiar spiders and distinct species of salamanders which are found in large numbers far underground but never on the surface.

"These caves hold many a secret of bygone and even prehistoric days. It doubtless happened in many instances, that a cave, sheltering many animal inhabitants, collapsed, the roof of the entrance giving way, burying its victims under tons of earth and rock, and completely destroying all evidences of the cave's existence. Here, protected from the influences of air and water, and in some cases even becoming covered with mineral deposits, the bones are preserved as valuable records of ancient fauna. In one such cave, opened again by accident, on the Breck Smith farm about eight miles west of Lexington, have been discovered the bones of coons, foxes, wolves, ground-hogs, skunks, a bear, a deer, a buffalo and even a human being—probably an Indian. Surely enough material for romance and tragedy."

That the caves were inhabited by men as well as by the lower animals there can be no doubt, and indeed primitive man

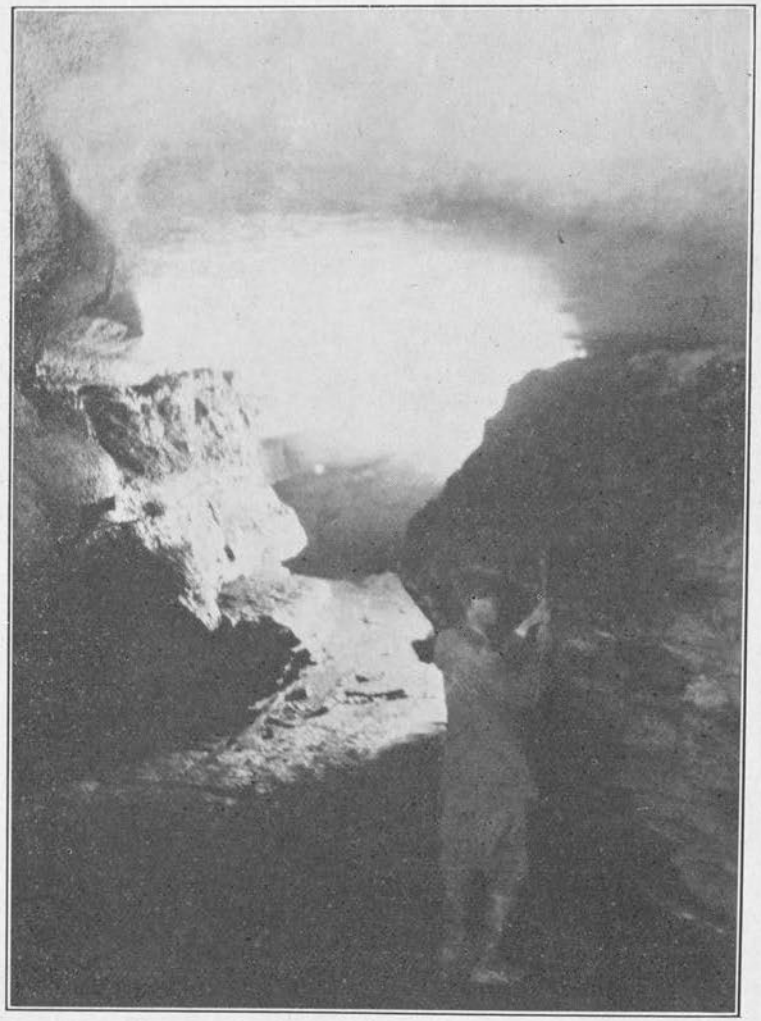


FIG. 66. THE HOME OF THE CAVE-DWELLER.
First chamber of an extensive Kentucky cave.

could hardly have found a more satisfactory type of shelter. Ordinarily, as would be expected, the portion of the cave close to the mouth was most commonly occupied and naturally those caves which were most roomy close to the entrance were the favorite dwelling places. Probably the deeper recesses of the

caverns were sought only in severe weather. Caves which are of sufficient depth have about the same temperature the year round offering protection from frost in the winter and affording relief from the heat in the summer. There is no question, however, but that the inhabitants often used the most remote passages for we find in the deepest and most inaccessable chambers the evidences of their presence. Nor are the lower levels at all unsuited to human habitation; on the contrary many of them are magnificent in their architecture—passage after passage, chamber after chamber, recess after recess, great domed halls and splendid cathedrals—and marvelously beautiful in the rare displays of stalactites and stalagmites and dazzling surfaces of crystal and onyx and ornamented rock.

Mammoth cave which is of course one of the most famous of the caves in the state, has yielded many proofs of man's early occupancy. In this cave have been found not only the usual flint artifacts not susceptible of decay but such perishable articles as moccasins, skins, gourds and cave torches which ordinarily would soon crumble to pieces but which in these cool caverns with their deposits of the preserving salt-petre have remained intact through the years. It seems evident that cave conditions are very conducive to the excellent preservation of objects entrusted to their keeping.

The cave which has yielded the greatest wealth of material of any in the state is Salts Cave, also in Edmonson County near Mammoth. Interesting articles have been found in this cave from very early times, there being records of finds which date as far back as 1851. This cave seems to have been inhabited over a very long period and doubtless by many generations of early tribes for the discoveries have included examples representing many cultures from the earliest neolithic to the modern Indian. Colonel Bennett Young in 1894 made a very careful and extended survey of this cave and reports the finding in addition to the usual flint spalls, flakes and arrows, of the following diversified objects: pestles, awls, reed torches, braided slippers, moccasins, fragments of textiles, mats, plaited rope, cords of bark, wild hemp, cat-tail and grass, baskets, basket head-dresses, wooden agricultural implements, dishes and vessels made of gourds, scraping tools, spoons and dishes made of

mussel shell, platters of sassafras wood, gourd bottles, curious woven bag or reticule, a reed basket, corn cobs, corn and even some leaf tobacco. More recently some of the students of Western Teachers College secured from the same cave a very excellent gourd water jug, a good piece of pottery and part of a human skull besides a number of small artifacts and fragments of other articles.

In Short Cave about eight miles from Mammoth Cave was found many years ago the now famous "Kentucky Mummy" which was for many years shown at Mammoth Cave, was for some time in the National Museum at Washington and is now in the Smithsonian Institution in that city. So far as we know the age of this mummy has never been definitely determined. It was removed from its original resting place before it had been studied in situ and later examinations have not proven entirely satisfactory. The body is that of a female with the flesh and skin perfectly dried upon the skeleton. When found it is said to have been clothed in deer-skin with a mantle made of linden-bark. The hair was short and of a dark-red color which gave rise to the theory of the "red headed Indians of Kentucky." The body was a little above the average size and the skin had apparently been neither red nor black but quite fair. A large sack by her side is said to have contained headdresses made from quills of feathers, a bark cup, a string of seed beads, a necklace of fawn-hoofs, an eagle claw pendant, a bear-jaw pendant, two rattlesnake skins, some pigment wrapped in leaves, some bone needles with thread made of sinews, and two cane whistles—surely a collection which indicated a wide variety of interests. But the antiquity of the mummy is very uncertain. Colonel Durrett says regarding it:

> "How long she was an occupant of the cave we have no means of determining or even of rationally estimating, but if the cave was two million years old, as stated by Professor Shaler, she might be allowed a few thousand of these years for her enjoyment of the darkness and solitude of her subterranean abode."

Incidentally, Colonel Bennett Young states that several mummies have been found in the caves in Kentucky encased in clothing.

The cave which has yielded the most material of any which we have personally investigated is at Mills Spring in Wayne

County about half-way between Burnside and Monticello. The cave is located on the farm of Hon. J. S. Hines and is known locally as the "Hines Cave." This region is rather famous historically since it is adjacent to Price's Meadow and Mills Spring where the "Long Hunters" who came to Kentucky from Virginia and North Carolina about 1770 are supposed to have camped for two years or more. Zollicoffer's entrenchments are still visible across the Cumberland River. The cave itself is extensive and is ideally situated for habitation. The land slopes from it gradually to the river, providing an excellent place for the cultivation of crops; the entrance to the cave is wide and

PHOTO BY A. S. HENDRICK

FIG. 67. ENTRANCE TO HINES CAVE.
Once occupied by prehistoric man.

high and the first chamber to which it leads is roomy and dry; the mouth is flanked by high cliffs which protect it from wind, rain and snow; the bottom is level and the light penetrates for a considerable distance from the entrance. Altogether it affords a shelter which must have been most desirable to a primitive race.

The entrance to this cave is about twenty feet high and opens into a room approximately 145 feet long and sixty feet wide and extends back for an unknown distance but the portions beyond the first chamber are separated by narrow passages which are now difficult to pass through because of the long accumulation of soil, rocks and debris which has been washed into them. The rock floor of this first chamber was struck at a depth of about twelve feet at the entrance and about six feet

in the rear. The cave was first examined in 1922 by a party consisting of Professor A. M. Miller, Doctor A. S. Hendrick, Doctor W. E. Tait, Victor K. Dodge, J. W. McCollum, Leland Snoddy, Professor J. M. Davis, Miss Bessie Conkwright and the authors and has been visited at various times and by various parties since that date. On two occasions rather extensive explorations were made and considerable time devoted to the examination of this and other nearby caves.

FIG. 68. A CAMP AT HINES CAVE.
Exploring party of 1922.

The floor of the Hines cave was trenched and found to contain the usual ash layers and the remains of many fires. Around these camp-fire sites were found most of the artifacts not found in the graves, particularly awls, needles and skinning-knives; in the ash beds were numerous animal bones. Also near the surface were layers of light-colored earth which probably represented the leachings from salt-petre which was in early days extensively mined in this cave according to local tradition.

Skeletons were found at different layers and undoubtedly represented different groups. The most superficial graves were found near the walls and contained skeletons which appear quite modern; the deepest graves were near the center and contained skeletons which we believe to be very primitive. Altogether about twenty graves were opened and from these were obtained nine fairly complete skeletons and four additional skulls from

skeletons which were not in condition to be removed. Some of the graves were of considerable interest. In one, for example, was found the skeleton of a dog beside that of the man.

In another was found the skeleton of a young woman who had more than the usual number of ornaments and decorations and who must have been a person of some importance in the tribe if we may judge from these decorations and the care which had been taken with the grave. She lay on her right side with her knees flexed, her right arm beneath and her left arm across her body. An arrow-head was found between her ribs. On both upper and lower arms and on her right leg above the knee were the remains of strings of very small shell beads. Around her neck was a sort of collar made of large shells.

Most curious of all, she held in her hand what must have been her most cherished possession for it remained encircled by her skeleton fingers after all the years; it was simply a shining bit of mica, about three inches in diameter and nearly circular. Its use is of course conjectural. Whether it was her mirror or her vanity we do not know—she must have been a typical flapper of her day—but the evidence of the desire for ornamentation can not be denied. Incidentally the character of this mica would indicate that it came from North Carolina and it is difficult to refrain from conjecturing as to how it was obtained by its final owner. Was she a North Carolina girl? Had her lover found this shining trinket and brought it as a gift? Had it been secured by barter from a wandering brave or had it been taken from the body of a slain enemy? We are tempted into the realm of romance where scientists are not supposed to venture.

Another skeleton—that of an old man—was of a quite primitive type. The skull showed a sloping forehead, strong superaorbital ridges and high cheek bones and the skeleton was very strongly ossified. The peculiarity of this skeleton was the fact that the top of the skull and the front of the tibiae showed lesions which were very suggestive of syphilis. It is an interesting occurrence suggesting that perhaps the venereal diseases of today were prevalent in prehistoric times. This discovery tends to support somewhat a theory which has been advanced to the

effect that these diseases originated in the New World and were first carried to Europe by early sailors.

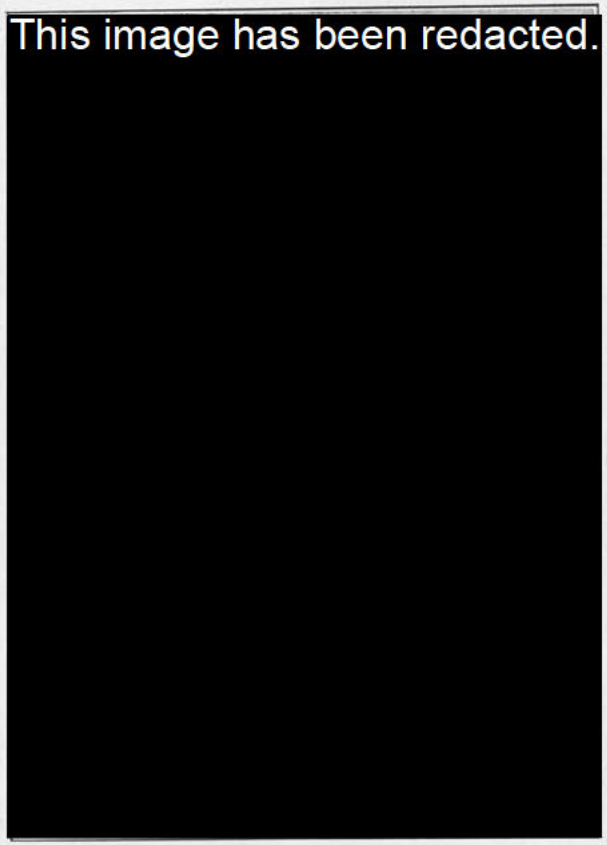


FIG. 69. OLD MAN FROM HINES' CAVE.
Showing lesion on top of skull which may have been caused by a venereal disease.

Another grave contained the bodies of mother and child with the babe against the mother's breast. Still another grave showed on the rocks which were pressed over the skeleton the imprint of a woven bark fiber which might have formed a burial garment and which lends support to a story told by natives that skeletons "wrapped in carpet" had been found in a neighboring cave about thirty years ago. The remains of eight skeletons

were found in one pit and although the bones were in bad condition they did not appear to have been thrown into the grave without regard to position as is so often the case in the multiple burials in mounds, but were carefully placed side by side with the heads bent forward and the knees doubled up under the chin.

This cave was rich in artifacts, the most abundant of which were stone hoes, flint arrow-heads, bone awls, bone needles, flint skinning knives, bone and flint drills and shell beads. A few of the artifacts represent rare and valuable types. Among these was a remarkable pendant of bone, most artistically fashioned and highly polished with the hole drilled horizontally through a flat projection at the top. Other unusual pieces included a clay pipe of unique design, a peculiar type of agricultural implement and several pieces of pottery of curious shape and decoration. The best and most unusual of these objects were found in the deeper graves which quite evidently represented the oldest culture in the cave.

The cave contained an unusually large number of animal bones which were gathered up and carried from the cave by the hundred. From these bones it was possible to recognize the remains of several distinct groups of animals. The carnivores were represented by the wolf, bear, wild-cat, raccoon and fox, the ungulates by the deer, elk and buffalo, the marsupials by the opossum, the rodents by the muskrat, squirrel, rabbit and beaver, and the birds by the wild turkey, crane and quail. The only reptilian remains were turtle shells and the only fish bones were those of the gar which is still to be found in the Cumberland River. Mussel shells were abundant as were also snails. Many of these bones had been washed back under low overhanging ledges at the sides and rear of the cave where they were packed in jumbled masses. The commonest ones were those of the deer and buffalo which seem to have been the chief items of the animal diet of these people.

Of course the always important question as to the age of the skeletons and artifacts is again a moot one. We believe however that they are very old. One reason for this belief is the fact that a number of the artifacts were found beneath a giant stalagmite nearly eight feet in diameter which stood at the entrance to the cave and reached nearly to its roof. How long it

took this colossal mass to form we do not know, for of course stalagmitic growth depends upon the drip of the calcareous water from the ceiling and this varies with the season. We know that in some cases it takes many centuries for even small ones to be deposited and the time required even under the most favorable circumstances to produce a stalagmite of this size must have been very great. Yet when by the use of dynamite this was dislodged we found beneath it many artifacts and some human remains which would indicate that they were buried previous to the time when the stalagmite started to form.

There are many other caves in the vicinity of Hines' Cave for this region is underlaid by the St. Genevieve limestone which is the chief cavernous formation of the state. Three or four of these are within a few minutes' walk from Hines' Cave and may be as rich in archaeological material but they have not yet been explored. Most of these caves are well-known to the inhabitants of the region, who, however, take very little interest in them and visit them only occasionally for a picnic or as suitable places for the storing of potatoes in winter. The children use them as playhouses and go to the entrances to build "campfires," hull walnuts or hunt arrow heads.

One of these caves, called "Cooper's Cave," has extensive clay deposits which have been mined either by the early settlers, by the Indians or by prehistoric people, for the marks of the tools are still visible in the clay banks in the farther parts of the cave. There is a tradition that this clay was once mined for fire-brick but it would be very poor quality for this purpose. This cave is very wet with the result that it is rich in stalactites and stalagmites. Also it has a series of clay rooms, on three levels through which the water flows in wet weather. An interesting formation in this cave is the large number of "bathtub" basins of many sizes whose irregular vertical sides have been built up from the drip from the roof and which are usually full of clear, cold water. The walls in some places are almost solidly covered by the cave crickets and the ceilings furnish the roosting-place for thousands of bats. So far as we know this cave has never been excavated but from the abundant evidences of its use by man for various purposes, we are inclined to include it as another former home of the cave-dwellers.

The "Hogg Cave" also on the Hines farm is not so large as the other two but has several good sized chambers and contains very beautiful stalactites. It has two outlets in sinks a short distance away. The floor has not been investigated but on the surface were picked up a number of artifacts and one human femur which had been gnawed by wild beasts.

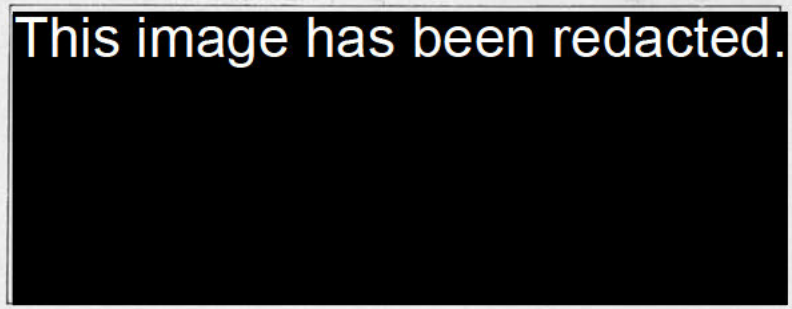


FIG. 70. GNAWED BY WILD BEASTS.
Human femur found in Hogg Cave, Wayne County.

Many caves, not in the true cavernous region of the state, are equally rich in indications of human habitation. The Phelps Cave in Fayette County has undoubtedly served such a purpose and is in fact so well suited for practical purposes that parts of it are now used for storing fruits and vegetables. It was in this

FIG. 71. ENTRANCE TO PHELPS CAVE.
In which were found bones which may have been those of a Pliestocene bear.

cave that the remains of what is apparently a Pleistocene bear were discovered.

A cave on the Breck Smith farm, also in Fayette County has yielded many human bones and artifacts in addition to one practically complete skeleton.

PHOTO BY A. S. HENDRICK

FIG. 72. BRECK SMITH CAVE.
A cave in Fayette County which has yielded a large amount of interesting material.

There is an interesting cave in Hart County about two miles west of Rowletts in which, according to local gossip, a "giant's skeleton" was discovered in recent years. Mr. R. E. Boyd kindly accompanied us to this cave and made long trips with us through the region in search of the "giant" which, needless to say, was not found. The cave, however, had unquestionably been inhabited and although the floor was thickly strewn with large rocks, yielded the usual collection of flint and shell.

Another cave in Hart County about four miles from Cub Run and 1½ miles south of Dog Creek which we visited is evidently the one discribed by Rafinesque. It contained a few flints and fragments of broken pottery but the floor was of solid rock and of course contained no graves.

About 2½ miles from Lawrenceburg in Anderson County on the Clifton Pike is a cave or tunnel which is about 800 yards

long, one end opening on the farm of Mr. E. Shelburn and the other on the farm of Mr. M. C. McBrayer. This cave, according to tradition was inhabited at the time of the early white settlers but when we visited it so much water was running through it that no investigation could be made.

A cave known as "Lynn's Cave" about 4½ miles southwest of Cub Run was rich in archaeological material. In addition to a number of flints, a needle, a war club and other artifacts, was found a very curious piece of either gold or brass bearing what seemed to be an Indian design but which was stolen from the finder before it could be identified or studied.

A cave on Dix River not far from High Bridge is locally known as "Boone's Cave," a name which signifies very little since there are dozens of caves along the Kentucky River which bear this name. This cave is a very old type, situated far above the water level and when examined contained tons of bat dung which covered the floor in places to a depth of many feet and was occasionally heaped almost to the roof. In this cave had been found, some years ago, a copper axe, which inspired the desire for its further excavation. A party of four worked in this cave for more than a week and during this time succeeded in moving most of the bat-guano and the other floor deposits; the result of our labors amounted to the finding of a single flint arrowhead of a common type which was not even perfect. However we do not doubt from the location of the cave, close to a good spring and with an excellent outlook, that it had been inhabited.

Other caves which we have examined and which are listed in a later chapter are much the same in structure and contents as the ones which have been described and the variations shown can usually be easily understood and explained by their location, size, contour or the conditions within them. As a rule, however, we believe that those suitable for occupancy were inhabited at some time or other and there is generally unmistakable evidence of this occupancy.

We feel quite sure, however, that the caves, like the mounds, represent more than one group of people. It seems reasonable to suppose that after one group had occupied them and had deserted them for one reason or another, a new group would move

in. Indeed, there may have been considerable strife for the occupancy of some particularly desirable cave and the tenure may often have been short for any one group for this reason. Contagion or pestilence may have caused the abandonment of such a shelter, or the growing number of graves or the increase in population may have been the cause of a migration. Even the continued accumulation of trash and refuse may have induced the search for a new home since it may have been easier to find a new cave than to clean out an old one. Be that as it may, it is certain that during the long periods in which they were occupied they sheltered many human beings some of whom doubtless would have been surprised if they could have known of those who preceded or were to follow them.

The explanation of burial in the caves may be because of religious beliefs or long established custom or because of a desire to protect the graves or merely because the floor of the cave was never hard or frozen and was easy of excavation as compared with outside conditions. Whatever the reason, we are glad that it existed, for cave burials are conducive to long preservation of the remains.

The very fact, however, that the cave conditions are well suited for the retaining of evidence adds to the difficulty of judging the length of time represented. On the floors of caves we find ash-beds and the remains of fires but nothing to show whether these fires were built by ancient residents or modern hunters; on the walls we find marks and decorations but in these protected recesses weathering is very slow and the scratches may be ten or a hundred years old; hidden in the crevices are pots containing grain or pigment but whether they were left there by the original cave-dweller or by the modern Shawnee we can not tell.

All caves are not equally suitable for occupancy by man or other animals and the type of cave has much to do with the probability of finding archaeological material. Other things being equal, a cave which is high and dry would be preferable to one which is low and wet, one that was large would be better than one which was small, and one which had high ceilings would be more comfortable than one which permitted only a stooping posture. If the opening of the cave is small or is difficult of

approach, we seldom find evidences of occupancy. If water flows through the cave either regularly or at intervals it usually rises so high during flood seasons as to wash all deposits off the floor and the only artifacts which we have ever found in such caves have been on high ledges. If the cave has a stone floor there is of course no possibility of graves. Caves which have more than one opening seem to be favored over those with a single entrance but we can give no reason for this unless it offered better means of escape in case of attack.

Generally speaking, those caves which are located rather high above the surrounding country, which have deep dirt floors and which open from a large entrance directly into a roomy cavern, have been the ones which have been the richest in evidences of prehistoric man. We have examined a number of caves or underground passages which opened from the bottom of a deep sink and have never found anything in them except animal bones. Of course some of the lower levels of the larger caves, such as Mammoth, are far below the surface but the approaches to these levels are usually not difficult and may often be reached from different directions and from different entrances.

The antiquity of the cave itself is of course a question of geology and to form such an opinion one must take into consideration many factors such as its position in reference to surrounding strata, terraces, peneplains, general physiography and especially with reference to the existing water table of the region. Naturally some caves are much older than others but most of them date so far beyond the time in which the archaeologist is interested that their geological age makes little difference. It may be assumed in general, however, that if a cave is high above the present water level, if it is situated on an ancient peneplain, if it has deep deposits of cave earth, if it has large numbers of stalactites and stalagmites or if it is much eroded, it is an old cave from the geological standpoint. On the other hand caves at or near the water level and now the source of streams may be considered as young. If the old caves are dry with no evidence of recent deposits of calcite or other carbonates it may be concluded that they are not only old but that the water level has sunk or that an ancient stream has been diverted from its course. In some cases the underground river of the cave may

represent the general drainage level of the surrounding country as in the case of "Echo River" in Mammoth Cave.

But whatever the age of the cave, it was doubtless the utilitarian aspects which appealed to primitive man. Ancient caves for the reasons indicated above would probably more often meet his requirements but there were doubtless times in which any sort of shelter would be acceptable.

Such were the homes of the cave-dwellers, homes in which no doubt many of them lived, died and were buried. In them are the few remaining evidences which keep their memory alive.

The Catacomb Legend

A myth which is often told and regularly finds its way into the public press, has to do with an extensive series of catacombs which are supposed to exist under the city of Lexington. The tale is probably nothing more than the figment of a well-developed imagination and there are absolutely no facts to support it, but because of its appeal to the fancy and its sensational nature, it always finds ready listeners. Limestone caves and spring water passages in the rock all of small extent are present beneath and in the vicinity of Lexington or elsewhere in the Bluegrass region. The catacomb story was apparently started by Thomas Ashe, an Irishman with a vivid imagination and a very slight respect for veracity, who visited this county in 1806 and on his return to England published in London in 1808 an account of his travels. In this account he described in great detail the extensive and magnificent catacombs beneath Lexington and the two thousand mummies, the idols, the spacious compartments and the altars which these catacombs contained. The legend was later referred to by G. W. Ranck in his "History of Lexington" published in 1872 and since that time has been repeated with many embellishments by other writers. Since there is no scientific foundation for such a tradition, we are forced to consider it merely a fanciful tale which has grown much in the telling.

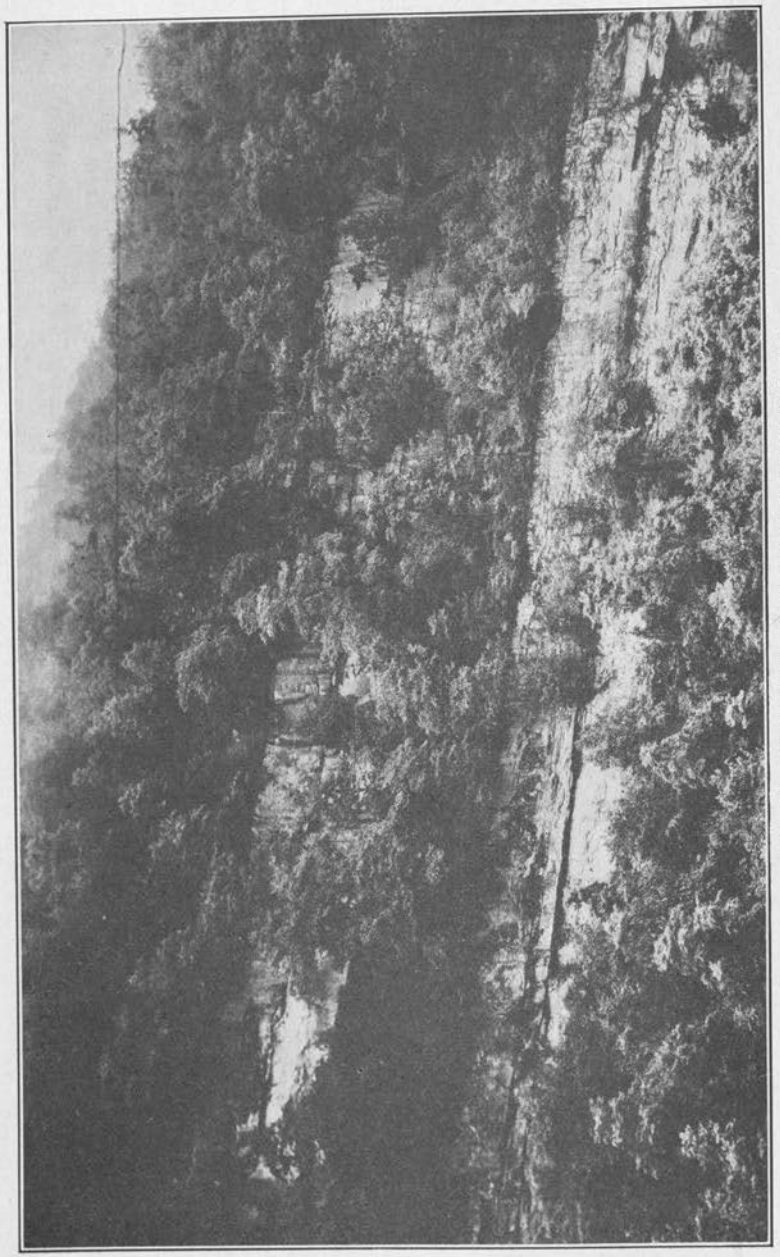


FIG. 73. THE HOME OF THE CLIFF-DWELLER.
Characteristic cliff formation with overhanging ledges which form the so-called "rock-houses."

CHAPTER VII

THE CLIFF DWELLERS

The Kentucky cliffs abound in overhanging walls of rock beneath which shelter is easily obtainable. These shelters are commonly called "rockhouses" and were used as habitations in prehistoric times. They are generally found in rough country where the sides of the mountains are precipitous but where often the scenery is very beautiful and the outlook most attractive.

These cliffs and overhanging ledges occur along the canyon walls of streams, as for instance where the middle Kentucky River has cut its gorge through the hard Highbridge limestone, and are particularly abundant at the head of coves trenched in the Coal Measure conglomerate along the western border of the Eastern Coal Field. Here they often take the form of the structures properly known as "amphitheatres" or "cirques."

Just as some of the ancient inhabitants of Kentucky were distinguished for the building of mounds and others were partial to caves, still others seemed to prefer to live in these high and sometimes almost inaccessable crevices in the rocks, and these people we are calling the "cliff-dwellers." There are many parts of Kentucky in which such cliffs with their characteristic rockhouses are abundant and in most of these places the homes of the cliff-dwellers may be found.

There seem to be very few reports on these rock shelters in Kentucky, although they are very well known and have been extensively studied in other parts of the United States, and consequently the ones which we have to describe are entirely those which we have ourselves examined.

While the cliff-dwellers probably do not at all represent a distinct race or a peculiar culture, still there are certain peculiarities in their artifacts, certain differences in their skeletons, and without question indications of certain unusual customs and practices which set them off from the other groups.

Among these distinguishing characteristics, one of the most striking is the practice of excavating in the rock floor of the shelter the so-called "hominy-hole" which seems to have

been used for the grinding of corn. Near these holes may usually be found the stone pestle which we assume was the implement used in crushing or grinding the grain in these holes. The hominy-holes are often three or four feet deep, generally four or five inches in diameter at the top and gradually becoming narrower towards the bottom.

They are usually bored straight downward in the face of the cliff but occasionally are found in the top of a large boulder. That they were an absolute necessity to the cliff-dweller and were constantly used is proven by the fact that it is very unusual to find a true rock shelter without one, and the additional fact that where a long series of shelters are found on the face of a single cliff, there are generally one or two and sometimes several holes in front of each shelter. The pestles are usually of limestone, from six inches to a foot or more in length, two or three inches in diameter, roughly cone-shaped, broad, flat and flanged at one end and rounded at the other, and sometimes marked with ridges or grooves.

Various types of pestles are described and figured in a later chapter on stone implements and their probable method of use discussed. It has been commonly supposed that the broad flat end represented the grinding surface and the rounded end the handle, but there seems to be some evidence to show that the opposite was the case and in fact that the pestles may not always have been used by hand at all, but may have been moved up and down in the hole by means of a thong or cord. However this may have been, the hominy holes and the pestles were in some way associated, and are very characteristic of the cliff-dweller.

An interesting artifact found commonly around the hominy-hole was a small cone-shaped rock, the use for which could not be imagined until we found one in the bottom of a hole in a position which indicated that when the holes became worn too deep, these stones were used as plugs to artificially raise the bottom. These plugs are likewise described and figured in a later chapter.

Since these hominy-holes are usually bored into the natural rock of the cliff, it is of course impracticable to secure a satisfactory museum specimen, and to be appreciated they must be seen in their original position. To saw out a section of the rock

containing the hole would give it a most artificial appearance, and consequently this particular type of the cliff-dweller's handiwork is seldom seen in museums. We were very fortunate, however, in finding on the farm of Mr. Wesley A. Bratcher, about two miles south of Cove Hollow in Hart County, a very fine specimen of a hominy-hole in a single large sandstone boulder which had by the process of weathering become detached from the face of the cliff.

Through the ingenuity and skill of Mr. P. F. Childress of Cub Run, this immense rock was successfully brought down the mountain side, dragged for a mile or more up a creek bed, carried on a wagon for twenty miles over extremely bad roads to the railroad at Munfordville and and there placed on a flat-car and shipped to the University of Kentucky where it is now on exhibition. It is believed that this is one of the few successful attempts to remove such a specimen without accident from its ancient bed and make it available for display as a unique and characteristic monument to the memory of the cliff-dweller. Incidentally, in this part of Hart County and particularly in a line of cliffs about four miles south-west of Cub Run, are to be found the finest series of hominy-holes which we have seen in the state.

Another characteristic of the home of the cliff-dweller is the peculiar type of kitchen-midden. Apparently the easiest way in which to dispose of refuse in a rock shelter was to sweep it over the side of the cliff and as a result the accumulation of debris is found at the base of the cliff directly beneath the shelter. Here it is to be found piled up in a talus. These trash-piles are often very rich in artifacts, probably because it often happened that objects fell over the side of the cliff which were not intended to be thrown away. We have found some of these heaps of refuse so large and so full of bones and other animal matter that the farmers in the neighborhood were hauling it away and spreading it over the fields to enrich the land, a purpose to which it was well adapted.

The largest and most extensive of these kitchen-middens which we have seen in Kentucky were found at the bases of "Cow Cliff," "Buzzards Cliff" and neighboring cliffs four or five miles west of Howe's Valley in Hardin County. Here also

are to be seen some excellent hominy-holes and some extremely fine shelters. During the summer of 1923 a party consisting of Professor A. M. Miller, Professor G. B. Roberts, Mr. George Roberts, Mr. Victor Dodge and the authors made quite an extensive survey of this region and through the kindness of Mr. H. P. Miller and Mr. George Pirtle of Howe's Valley were enabled to locate and examine a large number of the rockhouses of the neighborhood.

Graves are usually to be found against the back wall of the shelter but may be located at any spot where the accumulation of earth is deep enough to cover the body. Usually the dirt

PHOTO BY A. M. MILLER

FIG. 74. THE PAST AND THE PRESENT.
Miss Frances Johnson in a rock-shelter with the skulls of two cliff-dwellers.

floor of a rock shelter is shallow and therefore most of these graves are quite superficial. In such a rockhouse in Harlan County were found nine skeletons, all buried only a few inches below the surface. These skeletons were discovered in 1923 by Miss Frances Johnson, a fourteen year old girl at the Pine Mountain Settlement School who had heard stories of the "Indian Graves" under the cliffs and decided to investigate for herself. The result was the finding of skeletons and artifacts of great age and of considerable archaeological interest.

Dr. W. C. Connelly in 1927 reported the finding by Mr. Boyd Howard of two ancient skeletons in a rockhouse on his farm near the mouth of Coon Creek in Magoffin County. This

rock shelter, because of its suitability for the purpose, had been fenced in to form a hog-pen and the rooting of the animals confined in this pen uncovered the skeletons which proved to be those of an adult and a child, lying in ash-beds and covered by a large rock which had fallen from the roof of the shelter probably not later than a century ago. Old inhabitants of the neighborhood testified that certainly seventy years ago the rock had been in the same position and that two neighboring residents had secured enough stone from this rock in early days to build two large stone chimneys. The supposition in this case may be that this does not represent true graves, but might indicate the accidental crushing of the cliff-dwellers by the falling of the rock upon them.

The examination of the skeletons found in the rock shelters shows a peculiarity which, while not at all limited to the cliff-dwellers, seems to be more pronounced in this group than in any of the others. This is the condition of the teeth which in many instances are worn down until they are entirely smooth and flat. The cusps have been entirely worn off and the wearing process has continued through all of the enamel and deep into the dentine. Such a condition is not uncommon in many of these ancient skulls, wherever found, and has usually been explained by the supposition that certain foods which they consumed or certain materials which they regularly chewed were of such a nature as to thus wear away the teeth.

It has been suggested that parched corn might have been such a substance. We know that the Indians raised corn and that this food was well adapted when parched to being stored or to being carried on long journeys. Furthermore it was nourishing, would not quickly spoil, was light in weight and not particularly bulky. A constant diet of this hard corn might, however, injure the teeth in the fashion shown by the skulls. When we remember, however, the hominy-holes which are so characteristic of the rock shelters and when we note that the teeth of the cliff-dweller shows the worn condition so markedly, another explanation presents itself. It is conceivable that corn ground in these soft sandstone rocks would contain a large amount of sand and would give a mixture (the original "hominy grits?") which would certainly be hard on the teeth.

Whatever the cause, the condition undoubtedly exists. At first thought it would seem that such a wearing away of the tooth would result in considerable pain and discomfort. A longitudinal section of such a tooth shows, however, that as the enamel has been worn off, the dentine has been built up from below to compensate, and the pulp cavity is never exposed. Dentists assure us that this is not uncommon in modern man and that there are today many individuals, particularly those who have for years chewed tobacco, whose teeth are very similar to the kind we have described. In investigating this matter we find that this is indeed the case and that many old men who have chewed tobacco for years exemplify the fact. In following up this subject, it appears that some individuals, at least, are "right mouthed" or "left mouthed" just as they may be right or left handed—that is, they chew almost entirely with the teeth on one side of the jaw. In questioning an old tobacco user whose teeth on one side were badly worn while those on the other were not, we asked him why he did not chew his tobacco on the other side and his reply was that he could not—that he had tried it and "it made him sick."

While on the subject of teeth we may note, also that the teeth of many of the ancient skulls, not at all confined to the cliff-dwellers, show undoubted evidence of pyorrhea—verily, there is nothing new under the sun! Also we find many compacted molars, especially the wisdom teeth.

Many rock shelters may be found along the old "Indian Trails" across the mountains. Since these trails are often winding and do not always follow the shortest or even the easiest routes, we conclude that they were purposely made to pass close to these shelters for the very evident advantage which they would offer for camping-places and protection. The overhanging rocks in these places are often deeply stained by the smoke from many fires and show plainly that they have been often used, and in fact even today they not uncommonly serve the same purpose for modern hunters and trappers as they did in olden times.

Often, too, these "rock houses" are used by the present owners of the land as shelters for stock, for pens, for stables, for out-buildings and for storehouses, since they are high, dry and permanent. It is even rumored that they are not ill-suited

for the location of moon-shine stills. When not used by man, they are now regularly occupied by other animals, particularly by rats and buzzards, which seem to find them ideally suited to their needs.

A few of the best rock shelters which we have examined may be briefly noted. One of these is near the top of a mountain just outside of Pineville. This is an enormous shelter, almost worthy to be called a cave, and is traditionally an ancient habitation. Near it is an excellent spring and the locality is now a favorite spot for picnics. It is unquestionably an ideal situation for a home for early man. Incidentally, on the roof of this shelter were taken a number of rare spiders of a species seldom found in the United States.

In the stream valleys on the east side of the Pine Mountain range in Bell and Harlan counties there are many excellent shelters most of which show indications of habitation in prehistoric times. The west side of this range is precipitous and is little eroded but the east side is sloping and gives rise to numerous streams which in cutting their beds have left the typical overhanging ledges. This region illustrates also the association of shelters and old trails. There are few natural gaps in these mountains and where they exist they were doubtless taken advantage of by early man as they are today by modern man in seeking a route from one side to the other. These trails therefore usually zig-zag up the steep cliffs on the west side to such a natural gap at the crest and then follow a stream-bed down the east side and thus pass the rockhouses on the sides of these beds.

The entrance to the ill-fated "Sand Cave" (which is not a cave at all) in Edmonson County is a rock shelter which was at one time much larger than it is now. In the attempted rescue of Floyd Collins who lost his life while attempting to explore the cliffs at this spot, a number of Indian artifacts were found which indicated that the place had at one time been occupied by the cliff-dwellers.

An especially fine example of the "amphitheater" type of rockhouse is located at Torrent in Wolfe County. Here there is an immense chamber at the head of a deep hollow opening out of Graining Fork of Middle Fork of Red River. The roof,

formed by an overhanging cliff of conglomerate sandstone, is 160 feet above the floor at its outer edge and over this edge flows a stream which falls into a pool below and during wet seasons produces a curtain of spray. This stream originates a mile or two back on the ridge above the cliff and shows that the hollow is not the real source of the stream which excavated it.

The space under the cliff, eroded out by weathering and by the recoil of the water in the waterfall, has been fitted with seats so that it may be used as a place for public meetings. It is one of the largest and finest rock shelters which we have seen in the state and may have been used for the gathering of many an ancient clan before the white man discovered it.

On the farm of Mr. H. B. Woodring near Cub Run in Hart County, is a curious formation locally known as "The Castle." This is a typical rock shelter with a hominy-hole and an adjacent spring, and on the floor of the shelter and in the nearby fields the authors found an abundance of artifacts, particularly flint.

In this same region, in a line of cliffs about 4½ miles southwest of Cub Run are perhaps the finest series of rockhouses which we have ever examined. Fifteen of these shelters were found in a row along the cliff and high above the valley. The dirt floors contained graves and were rich in artifacts while the kitchen-middens at the foot of the cliff were also the source of interesting finds. Through the courtesy of Mr. J. F. Geralds, Mr. J. N. Mansfield, Mr. P. F. Childress and Mr. R. E. Jaggers, we were allowed to excavate a number of these shelters and secured in addition to arrowheads, scrapers, knives, stone hoes, bone needles, sandstone gorgets and fragments of pottery, the best series of worked shell artifacts which we have found in the state.

Some of these, especially the shell scrapers and the shell spoons which are described in a later chapter, were quite unique. It may be noted, in this connection, that shell objects are very hard to find in good condition since they are so fragile, so easily broken and become disintegrated so quickly, but cliff conditions seem to be conducive to their preservation and therefore the rockhouses are likely to furnish a good collecting ground for this type of artifact.

In a neighboring line of cliffs on the farm of Mr. W. A. Bratcher, where the hominy-hole previously described was secured, is a similar series of shelters which while not so extensive yielded a considerable number of skeletons, pottery pieces and animal bones and a curious type of arrowhead of blue flint with expanded shoulders and serrate edges.

Investigations in this same part of Hart County on the farms of Mr. George Waddle and Mr. Robert Childress showed that this region was without doubt thickly inhabited at one time by the cliff-dwellers, for everywhere we found the typical rockhouses, the hominy-holes and the graves.

FIG. 75. CLIFF-DWELLER COUNTRY.
Showing the physiography of the knob region.

Another excellent type of cliff-dweller shelter was investigated on the farm of Mr. Hugh Yates at Vine Grove, Kentucky. Here the characteristic conditions obtained and a large amount of material was discovered at the foot of the cliffs.

A region which is even richer in rock shelters exists in those counties which border the Coal Field in the eastern part of the state but the authors have had little opportunity to examine these localities and they must await future investigation. A fine large "rock house" is located on Mill Creek in northeastern McCreary County near the Cumberland River and would be well worth a detailed examination.

Enough work has been done, however, to convince us that the homes of the cliff-dwellers are well worthy of continued and extensive study. Like the caves, they represent ancient habitations of man which are fitted for preserving the evidences of his existence through long periods of time and being usually located in more or less inacessable parts of the country and in thinly settled communities they have not been greatly disturbed by the vandalism of modern civilization.

CHAPTER VIII

THE RIVER PEOPLE

In 1916 Professor C. B. Moore published an interesting report on the shell mounds which he had investigated on Green River in Kentucky.

In the summer of 1924 the authors accompanied by Mr. W. J. Curtis, made a trip to this region and visited not only the various mounds reported by Professor Moore but a large number of other sites in the vicinity which had been the dwelling places of a prehistoric race. Since all of these sites were along the rivers and since the shell-mounds, the artifacts and the village sites indicated a tribe of fishermen and boatmen, we have chosen to call the tribe or tribes, whoever they were, the "River People."

Here again we must repeat that these people may have represented no peculiar race or culture but, as in the case of the cliff-dwellers, we find certain distinctive features which warrant the consideration of their habitat and habits in a separate chapter. They are generally considered as an Algonquin or pre-Algonquin people.

River sites are as a rule small, not extensive and often almost entirely washed away by high water, but they may be found along most of the rivers within the state as well as along the banks of the Ohio and Mississippi. We are forced to conclude that the river-people were not numerous and that their villages were widely scattered. Wherever the sites are found, however, they show the same peculiar banner-stones, the hooked horn implements for net-making, the bobbins, the sizers, the mesh-spacers, the net-sinkers and the fish-hooks so characteristic of a river-inhabiting tribe.

The outstanding features of the work of the river people are the "shell-mounds"—enormous heaps of mussel-shells found near the river banks—some of them containing many tons of shells and often standing ten or fifteen feet high. The occasion for the piling up of these gigantic mounds of shells can of course only be conjectured. We assume that the mussels

must have been used for food in which case the heaps represent either the accumulation over a long period of years or the assemblage for a shorter time of a multitude of people. The shells are usually unbroken which would suggest that the mussels had been cooked or at least heated before the contents of the shells were removed since the edges of the valves show no indication of their having been forced apart while the animal was alive, a process which would certainly have fractured the margins. Often the two valves are still together, tightly closed with the hinge uninjured and sometimes the space between them is filled with dirt but more commonly the valves are empty. Even when the valves are separated or broken apart, they are not mutilated nor do they show signs of heating or charring. It is difficult to imagine a method of cooking and eating which would leave them in such perfect condition. The inhabitants of the regions where shell-mounds are common, use the shells for grits for poultry and occasionally grind them for lime fertilizer.

Sometimes the shell-mounds are so large as to resemble natural hills and indeed they are often located on natural elevations. Occasionally they are extensive enough to furnish the sites for houses and barns. Usually they are not suitable for cultivation since the water drains through the loose shells so quickly that the plants dry up for lack of moisture. In them may be found burials, artifacts, refuse, and in fact everything usually found in other types of mounds but whether the skeletons were the occasion for the mounds or represent intrusive burials we do not know, and whether the objects mixed with the shells were originally a part of the mound or represent accidental associations we can not tell. Always the objects found in the mounds, even the most easily perishable bones, beads and shell ornaments, are in an excellent state of preservation, probably because of the fact that the drainage is so good that no water can stand in the piles of loose shells and perhaps also because of the fact that the lime itself tends to preserve them.

It may be noted that the rivers in and around Kentucky are very rich in mussels, not only in the number of species represented which is very large, but in the abundance of individuals of many of the species. For this reason, these waters

have for years been the source of supply for shells for commercial uses, especially for the button-factories.

One of the largest of the shell-mounds on the Green River is the one designated as "Indian Knoll" by Professor Moore. This is located in Ohio County just across the river from Paradise, Kentucky, on the property of Mr. Jared Brown and tenanted at the time of our visit by Mr. Joe Winters. The mound covers several acres and has on it three frame buildings. The made dirt which is four or five feet deep is composed of rich black river-valley loam with a large amount of mussel-shell scattered through it.

It was on this spot that Professor Moore and his staff of eight men worked for over twenty days and discovered two hundred and ninety-eight burials, represented by skeletons of 183 adults, 23 adolescents and 92 infants and children. These skeletons were found in various positions, some closely flexed, some partly flexed, some extended and some which indicated that they had been disturbed. The skulls were described by Doctor Ales Hrdlicka of the United States National Museum as "typical, undeformed Algonquin skulls, evidently not Shawnee, although coming from the region ascribed in general to that tribe." We saw, at the residence of Mr. Jared Brown, at Paradise, four of these skulls which were in excellent condition.

The outstanding artifacts of this mound, according to Professor Moore's report, were the so-called "netting-needles" and the "sizers" indicative of the vocation of fishing. A number of skeletons of dogs were unearthed, which according to Doctor G. S. Miller were very similar in structure to those of modern European dogs and suggested a common evolutionary origin. In this mound was found, also, the human vertebra transfixed by a spear-point of antler which is figured in Professor Moore's report. The present authors made only a superficial examination of "Indian Knoll" since it had been so thoroughly explored by the Moore expedition, but the field had been plowed since the former excavations and was in corn and tobacco and on the surface were found a large number of artifacts and bones which had been brought to light by the more recent cultivation. Mr. R. W. Taylor stated that he had seen this mound entirely covered with water during the flood season.

Another large shell-mound which we were permitted to visit through the courtesy of Mr. W. E. Dortch is known locally as the "De Weese Mound" and is located near the bank of the Green River in Butler County about ten miles by road but a much shorter distance across country from the village of Prentiss. This mound is very similar in size and appearance to Indian Knoll but is situated on higher ground and on it is built a farm-house and a barn. The mound is thickly covered with shells and the neighbors for miles around regularly visit it to secure the shells for their chickens. We did not have an

FIG. 76. CAMPING ON GREEN RIVER.
A temporary camp established for the study of shell mounds.

opportunity to do any excavating in this mound but on its surface were picked up a number of artifacts and animal bones and between the mound and the river the ground is thickly strewn with flint spalls.

The largest shell-mound which we have examined carefully was located on the banks of the Green River in Ohio County only a short distance across the pike from the general store at Green River Postoffice. Through the courtesy of Mr. F. M. Knight, the storekeeper and postmaster of this village, we were allowed to camp on his premises and were given every opportunity for carrying out our work.

This mound, which so far as we could learn has no special name unless it be that of "the mound at Chiggerville" (the local appelation for the village), was about 100 yards long, 75 yards wide and when we visited it about ten feet high. It is some-

times (for example in 1913) entirely covered by high water and has been cultivated for many years and these two factors have probably made it lower and wider than it was originally. On the surface of the mound and on the surrounding field were found large numbers of flint artifacts, a number of pestles, several hammer-stones, a bottle-stopper, many human and animal bones and one quadrant of a banner-stone.

After making a series of exploratory holes in the various parts of the mound it was trenched completely through the center from north to south.

FIG. 77. TRENCHING A SHELL MOUND.
Characterisitc shell heaps on the banks of Green River.

The mound was found to consist of an almost solid bed of mussel-shells for a depth of six feet. Mixed with the shells were human, elk, deer, wildcat, and wild-turkey bones but no complete skeletons were found in this trench. Flint and bone artifacts were also scattered through the mound but seemed to have no association with the bones. The shells were packed closely together and apparently had been undisturbed for a long period so that they had settled into compact masses of lime. This condition made excavations very difficult as it was impossible to force a spade or shovel through the mass of shells and it was necessary to first loosen them with a pick before they could be thrown out of the trench.

Below the mussel-shells was found a layer of made dirt mixed with charcoal to an average depth of two inches and below

this the natural river sand which has evidently not been disturbed.

East and west trenches at the ends of the mound showed the same formation. In one of these trenches was found the fragmentary skeleton of a child but there were no artifacts nor ornaments with this skeleton.

Other mounds in the vicinity showed the same structure. Some contained burials, many were rich in artifacts and all gave evidence of the one outstanding feature—the use and piling up, for some purpose or other—of such an enormous number of shells that the mind was overwhelmed in estimating their mass or in trying to account for their presence.

On the Green River, also, in addition to those we have mentioned, Professor Moore reports and describes similar mounds near Bluff City in Henderson County, on the Austin Place in McLean County near Smallhouse, in Ohio County, on the Annis Place in Butler County, on the Martin Place in Butler County, on the Cherry Place in Butler County, near Little Reedy Point in Butler County and a location called "Indian Hill" in Edmonson County. Some of these have never been explored and still await the investigator.

The Green River country, therefore, was no doubt a favorite part of the State for the river-people but their residence was not at all limited to this region. There are many such sites along the Kentucky side of the Ohio River including a series of mounds in Ballard County almost opposite Mound City, Illinois, in a region famous for evidences of prehistoric man and rich in Indian lore, an interesting burial and village site also in Ballard County on the edge of Colvin Lake, a dwelling-site near the mouth of Massac Creek in McCracken County from which Professor Moore secured twenty skeletons, an ancient cemetery in Livingston County on government land, a field from which a fine collection of artifacts has been secured on the river bank in Hancock County almost due north of Lewisport, a village site on Diamond Island in the Ohio River just south of Henderson, and a river mound on the Major farm just outside of that city.

On the Kentucky side of the Mississippi, too, in Carlisle, Hickman and Fulton counties, similar sites have been reported.

In one mound in this region, about six miles west of Hickman, Kentucky, were found what appeared to be evidences of a cremation and in the town of Wickliffe in Ballard County is a site which is very celebrated locally, for the number of skeletons and artifacts which it has produced. Mounds on the Chaney Place in Hickman County and on the Turk Place and the Edwards Place in Ballard County are recorded by Moore but have not been visited by the authors. Not all of those sites have the typical shell mounds but almost without exception all of them are rich in shells, which are sometimes mixed in the soil in great quantities and prove that the mussel played a large part either as a food or in some other way in the life of the river people.

The region which most nearly approximates the Green River country in producing the typical evidences of the river folk is the so-called "Coalins" between the Tennessee and Cumberland rivers and along the stretches of these rivers farther from their mouths. Here are to be found again the heaps of shells, the sizers, the banner-stones and the flint hoes which we associate with the river dweller.

In an earlier report (1915) resulting from an expedition which took him through part of Kentucky, Professor Moore describes habitations of the river-people on the property of Mr. W. A. Henson on the Tennessee River in Marshall County. We were fortunate in being able to visit this site in September, 1924, and through the courtesy of Mr. Jesse Henson, Mr. Albert Henson, Mr. Homer Sirls and Mr. Sut Ferguson were enabled to examine these sites as well as many others in the vicinity. A most delightful camp was established near the river and due to the kindness of Mr. Harry Cotrell the County Agent and Mr. Clyde Philbeck, principal of the Benton High School, assistance was given us in doing intensive work.

The most typical evidences of the river people in this region were found at the mouth of Jonathan Creek and on the property of Mr. Tom McNealy on the bank of the river. Here were located shell-mounds, most of which had been leveled by cultivation, the mussel-shells scattered over many acres, the flint hoes and the lap-stones, presumably some sort of mortar, all of which seem to be characteristic of this culture. Also the surface of

this region yielded a large number of excellent flint arrowheads and flint knives.

Summing up our knowledge concerning the river-people we may say that the outstanding features are the sites along the streams, the shell mounds and the use of the mussel in great quantities for some purpose not entirely explained.

Of the artifacts, the most characteristic are the banner-stones and the implements used in fishing. Of the former, we know but little as to their actual significance. We assume that they were some sort of emblem, either tribal or individual, of

FIG. 78. IN THE LAND OF THE RIVER PEOPLE.
A camp on the Tennessee River in Marshall County. "Indian-digging" always attracts many visitors from the neighboring farms.

rank or office. These banner-stones show perhaps as elaborate workmanship as any ancient artifact known. They are often highly polished, carefully bored, and doubtless represent long tedious labor in their fashioning and great care in their preservation. Such a beautiful object may bave been highly treasured and handed down in a tribe for many generations. The fact that quadrants of these stones have been found very exactly and apparently carefully broken, has suggested that perhaps on the death of an individual his particular emblem or totem should be destroyed by ceremony in such a way that it could not be used by another individual. These interesting objects are figured and described in a later chapter.

Of the implements presumably used in the fishing industry, the most abundant and the most easily recognized are the "netting-hooks" of various kinds, usually made of bone or horn, and the interesting objects commonly referred to as "mesh-spacers." These spacers represent also great labor and care in their manufacture and are often very beautiful in their design and polish. Attention has been called by archaeologists to the fact that modern Papuans make fish-nets by the use of a hook and sizer very similar to those used so long ago by our own river-people. Netting-needles very similar to these in the shell-mounds have also been found among certain Alaskan Indians.

Another implement which seems to be restricted to the regions occupied by the river-people is the flint hoe. Limestone hoes are very common and are found in practically every part of the state but we have never seen them made from flint except from the river country. Some of these hoes, both notched and plain, as described later in this report, are exquisitely wrought and highly polished.

The lap-stone or flat mortar is also rather indicative of the river people. The stones sometimes have the concavity on both sides and occasionally have smaller depressions in the corners which suggest that they may have been used for cracking nuts. The largest collection of these objects we have ever secured was obtained along the Tennessee River in Marshall County. Another peculiarity of the river-people is the fact that apparently they never used pipes. We have never found a pipe in the shell mounds and so far as we can find from the records, this is the usual experience of collectors.

The skeletons of the river-people seem to show no particularly distinctive characters. We have already quoted Doctor Hrdlicka to the effect that they were typical Algonquin and we have yet to see one which was deformed. The skulls are rather modern in appearance with high frontals and excellent teeth.

Altogether we believe that we are dealing here with a rather modern group, not numerous and much scattered, whose chief industry was fishing and who had developed to a remarkable degree the art of fashioning the implements needed in their craft. The time during which they were in Kentucky is purely conjectural as is their possible relationship to other groups. Cer-

tain indications, as for example the fish-tail banner stones and the bone netting-needles, might suggest a connection with northwestern tribes, possibly Alaskans, and it is not impossible that they may have migrated inland from the western coast, bringing with them the practices of ocean fishermen and retaining the customs of such a people. Or they may have been descendants of such a folk and while still keeping the love of the water had retained only half-forgotten traditions of the ceremonies of their ancestors so that their banner-stones and artifacts while still used had become almost meaningless to them. Whatever their history, they are deserving of definite notice, and we can at least record the little that we know of them under the descriptive term of "river-people."

CHAPTER IX

THE STONE-GRAVE PEOPLE

There is hardly a writer on prehistoric sites in Kentucky who has not commented to a greater or less extent on the peculiar type of stone grave which is found rather commonly throughout the state. These graves are quite different from the irregular covering of stones which marks most primitive burials and consist of a very definite cyst or cairn with the stones regularly placed in an orderly and uniform fashion. So distinctive are these rock sepulchers and so characteristic are some of the customs which they represent, that again we are choosing to discuss them separately and to designate their builders as the "Stone-Grave People." Doctor Warren K. Moorehead states (Moorehead, 1910):

> "Ohio and Kentucky stand as two separate cultures separated by the Ohio River. Yet the Ohio River was made use of by prehistoric man from above Pittsburg to its mouth at Cairo. . . . In Kentucky the Cumberland and Tennessee are in a class by themselves. . . . These two rivers are so long, and as each is navigable far into the State of Tennessee, I feel certain that five or six cultures may be clearly differentiated within their valleys. . . . The stone-grave culture of this region . . . merits further detailed study on the part of archaeologists."

After the examination of a very large number of stone graves, located in different parts of the state, we believe that we are justified in reaching the following conclusions: (1) That this type of stone cyst, wherever it is found, represents a single group of people (2) that these graves are not naturally associated with mounds, even though there may be mounds near them, (3) that the graves are all constructed on the same general pattern, although they may show slight variation in their structure, (4) that the dead were seldom if ever buried with artifacts, and (5) that this group is as distinctive and represents as definite a culture as any one group with which we have to deal.

In support of these conclusions, we may note certain general observations which we believe are worthy of consideration. Regarding the structure of the graves we may say that they are usually close to the surface and shallow. Many have been found

in locations in which there had been little opportunity for erosion from the surface and where there had never been any cultivation or other disturbances of the top soil and even in such locations the tops of the rocks forming the cairn were barely below the surface. The floor of the grave is usually made of a series of stones laid flat and close together on which the body rests. The sides of the grave are built of flat stones set on edge, generally straight but sometimes at an angle so that the upper edge consists of a series of corners of these stones. The head and foot of the grave is fashioned in the same manner and usually, but not always, these head and foot stones are somewhat higher than the others. All of the stones forming the sides and ends of the graves are neatly placed, close together and in line, so that the entire cyst is well enclosed and well made.

The graves are just deep enough and just long enough to contain the body and apparently each had been constructed for the particular corpse which is to occupy it. The top of the skull and ends of the feet in most cases just touch the stones at the head and foot respectively and the tops of the side stones are no higher than would be required for the thickness of the body. Over the body were placed other stones, laid flat, again neatly arranged and so close together that little earth would fall into the grave. If the grave is disturbed, it is of course this top layer which is usually displaced and in many cases where the graves are located in what are now cultivated fields, these stones have been dragged from their original position by the plow. The graves do not seem to be oriented in any definite way in respect to the points of the compass although the majority of them are perhaps more approximately east and west than in any other direction.

The skeletons in all the graves which we have examined were fully extended and lying either on the back or on the side. In rare instances we have found two skeletons in one grave. As is the case with other prehistoric groups, the skeletons represent individuals averaging below rather than above the normal height of modern man. The skulls are the most modern in appearance of any which we have seen and in many particulars are suggestive of present races.

We have never found artifacts of any kind in a stone grave and Mr. W. J. Curtis, who has perhaps investigated as many such graves as any man in Kentucky, states that his experience has been the same. Apparently the stone-grave people did not have the same customs in burial as did other primitive groups and the absence of the usual ornamentation, decorations, weapons or food in the grave is an example of this. Perhaps they were above the savage superstitions or beliefs which in more primitive races demanded these ceremonies. In one or two cases only have we found fragments of pottery in the grave, in

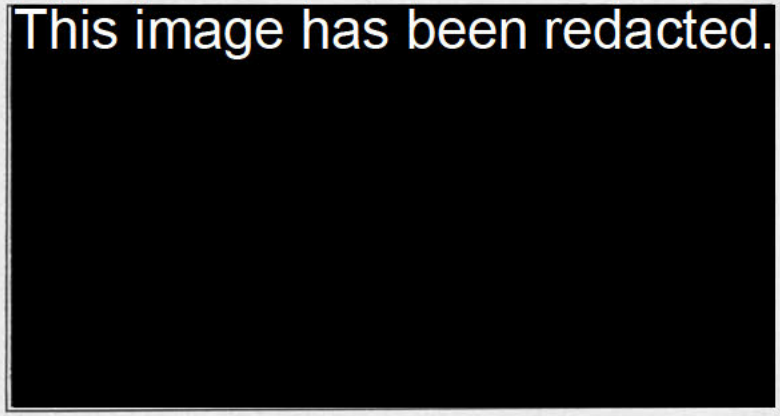


FIG. 79. TYPICAL STONE GRAVES.
Three "east and west" graves in close proximity.

one case what appeared to be a broken cooking-vessel, but in most instances the graves are devoid of accessories.

Since all stone-graves, as we have stated, are very much alike, the description of one typical cemetery of such graves will suffice to give a general idea of this phase of the subject. The collection of these graves which we have had the opportunity of examining most carefully was located in the southern part of Christian County on the farm of Mrs. R. D. Glover about five miles southwest of Trenton. This farm contained, in addition to the stone-graves, a mound, which we believe to be quite old and to represent an entirely different culture, and what was apparently the remains of a race-track which we consider quite recent and probably used by modern Indians in their sports.

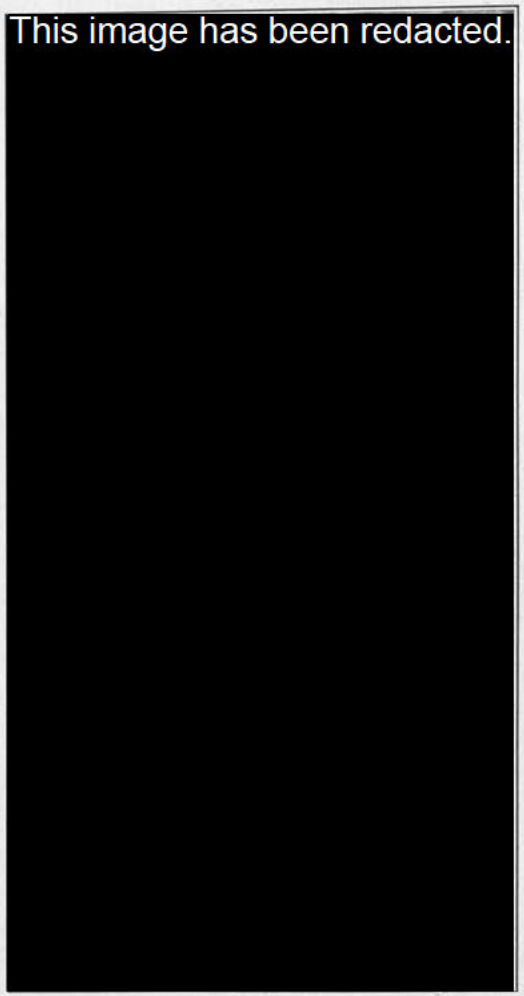


FIG. 80. OLD WOMAN WITH ONE TOOTH.
An excellent example of a stone grave burial in which the sides and ends of the grave are made with eight large flat stones.

The stone-graves occupied a low ridge about 1,000 yards long, 100 feet across and approximately 15 feet above the general level of the field. There was no made dirt on the ridge which was simply a natural rise in the rolling country of the region. According to local tradition there had originally been hundreds

of graves on this ridge and we were assured that they had all been opened and that nothing except skeletons had ever been found in them. These skeletons according to the residents of the neighborhood had all been destroyed and we were told that the chances were very unlikely that we could find a grave which had not been ravaged. However, in the hope of finding some which had not been molested, we made a rather careful survey of the ridge and as a result located a number of burials which had never been disturbed and which proved to be very typical of the stone-grave people.

A few extracts from our field notes will serve to describe these graves. In explanation of the names mentioned in these notes it should be stated that we were accompanied on this trip by Doctor M. N. States of the University of Kentucky, a connoisseur of camp cooking, and Mr. J. A. Estes the City Editor of the Lexington Herald. We were taken to the field and assisted in many ways by Mr. S. S. Sherron, Scout Commissioner of Hopkinsville and Rev. Gregory of Trenton and were extended many courtesies by Messrs. R. G. Glover and Armistead Glover the sons of Mrs. R. D. Glover the owner of the farm. A camp was established within a few yards of the burial ridge and with this camp as a center we were able to make trips to a number of other prehistoric sites in the neighborhood. The following notes refer specifically to the burials on the ridge described:

R. D. Glover Farm, Christian County.
June 7-12, 1926.

Grave No. 1.

Opened by Funkhouser. 5 ft., 5 in. long and averaged 17 in. wide (inside measurements). Stones well set and very well proportioned. Skeleton in good condition. Head toward the east. Lying flat on back with arms at side and legs extended straight. Face turned slightly to the right. Adult male.

Grave No. 2.

Opened by States. Under a locust tree the roots of which had forced the stones of the grave out of position. Fragments of two skeletons both in such bad condition that they were undeterminable. It was impossible to secure the measurements of the grave or to be sure of its exact position as the growth of the tree roots had badly disarranged the stones and the bones and the soil was here very wet.

Grave No. 3.

Opened by States. Grave 6 ft. long and 14 inches wide. Stones somewhat out of position at foot and sides. One skeleton very

close to surface. Bones in very bad condition. Adult male. Head pointing a little south of east and face turned slightly to the left. Base of the skull, most of the vertebrae and all of the tarsals, metatarsals and toes entirely rotted. No artifacts.

Grave No. 4.

Opened by Funkhouser. 5 ft. 6 in. long; average width 16 inches. Three stones on each side, one at head and one at foot; the one at the head was visible above the surface, the tops of the others about 2 inches below the surface. Corners of grave well squared. One skeleton 9 inches below tops of side stones. Very old woman with only one tooth—a lower incisor. Jaw bones entirely healed over sockets of other teeth. Head toward the south. Flat on back with body straight. Remains of a shallow pottery vessel with scalloped edges *under* feet. Fragments of pottery at head. No artifacts.

Grave No. 5.

Opened by M. N. States. 3 feet east of No. 4. Well constructed grave outlined with very heavy stones. Grave extended east-west; 6 ft. 4 in. long; 12 inches wide at one end, 19 inches wide in middle and 16 inches wide at the other end. The stone at the 16 inch end was missing. Grave was empty.

Grave No. 6.

Opened by Webb. 2 ft. south of No. 5. Outlined by heavy stones only one of which projected above the surface. All of the stones had the corners turned upward and the ends of the grave were rounded instead of square, three stones making the curve at each end. The grave was very unusual in its shape and in the position of the stones. Measurements: 6 ft. 7 in. in length; 19 inches in width. One skeleton with head toward the west. Bones almost entirely decomposed. Adult. No artifacts.

Grave No. 7.

Opened by Webb and Funkhouser. 6¼ ft. long and 14 inches wide. Very well made with large stones. One skeleton. Adult male with head toward the east, lying on right side with right arm under body. Legs crossed at the ankles, the right leg under the left. No artifacts. This is the first skeleton we have found in a stone grave in which the legs were crossed.

Grave No. 8.

Opened by Estes and Funkhouser. 6½ ft. long; 16½ inches wide. Grave in bad condition with walls partly broken down and bones very rotten. Contained remains of two skeletons, one in natural position on back with head toward the west, the other fragmentary with the bones out of natural position. Both apparently adults but otherwise undeterminable. No artifacts.

Grave No. 9.

Opened by Estes. 5 ft. 10 in. long; 16 inches wide. Side stones at head of grave out of position. One skeleton. Adult female, flat on back with face turned slightly to the right, arms at sides and legs extended and straight. Head pointing a little south of west. Bones in very bad condition and skull crushed. No artifacts.

Grave No. 10.

Opened by Webb. 6 ft. long; 18 inches wide. Well-built of heavy stones. A large upright rock over the *middle* of the grave

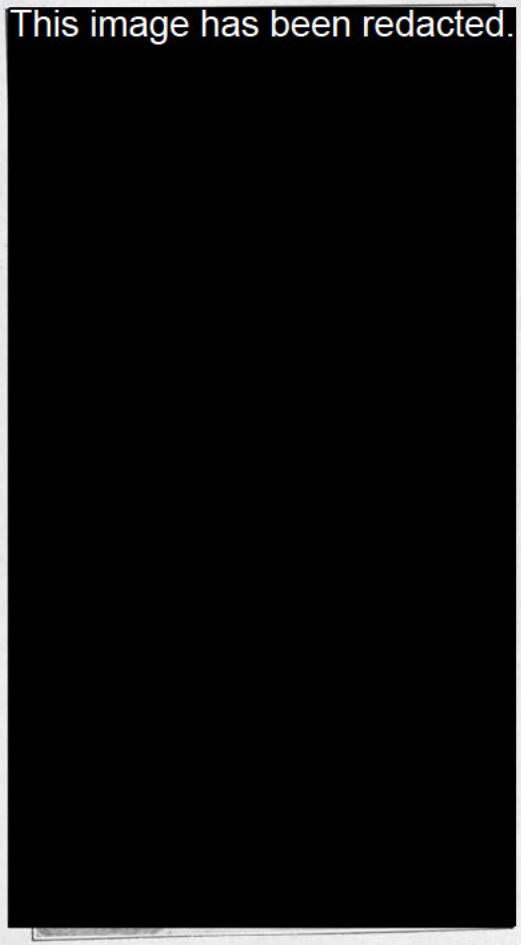


FIG. 81. THE TALLEST OF THE STONE-GRAVE PEOPLE. An unusually large skeleton in stone grave in western Kentucky.

projected out of the ground and was the only external evidence of the grave. Large skeleton in good condition. Lying on back with arms at sides and legs straight. Head bent over toward the right as though the grave had been too short for the body. Skull crushed in left frontal region. Head pointed slightly south of west. This is the largest skeleton we have found and the individual probably measured close to six feet in height. No artifacts.

Grave No. 11.

Opened by Funkhouser and States. 6 ft. 2 in. long; 23 inches wide. On slope of ridge. Two of the protruding side rocks of

the grave broken. One skeleton with the head toward the west. Skull only two inches below the surface and almost entirely rotted away; lower half of body a foot below surface with bones in much better condition. Adult, sex undeterminable. No artifacts.

Grave No. 12.

Opened by Funkhouser. Side and end walls so badly broken down or missing that exact measurements are impossible. Grave extends north and south. Only fragments of skeleton found and these are apparently bones of a child. No artifacts.

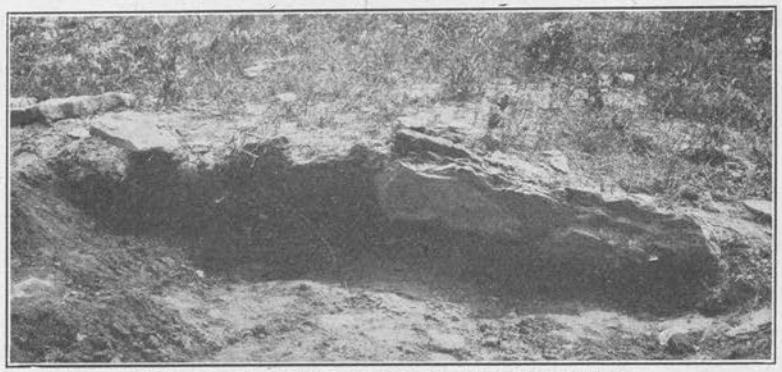


FIG. 82. A STONE GRAVE NEAR CARLISLE.
An opened cyst showing the structure of the side walls.

Grave No. 13.

Opened by Funkhouser. 5 ft. 9 in. long; 14 inches wide. Grave excellently made and stones in good allignment. One skeleton; adult female lying on left side with right leg drawn up over left. Feet missing. Head pointed toward the east. No artifacts.

Grave No. 14.

Opened by Estes. Grave and skeleton in such bad condition that disinterment and measurements not feasible. No artifacts.

The cemetery which we have described above we believe is typical of the stone-grave people and is the largest of that type which we have worked. Smaller groups of such graves are rather common, however, in many other parts of the State. A considerable number have been found in Nicholas County, particularly in the neighborhood of Carlisle, and Mr. Curtis reports them from Robertson County.

Similar graves have been found in Mason County near Mays Lick and several have been reported from Muhlenberg and Logan Counties so that it is apparent that the stone-grave

people had a wide geographical range over the state. In all cases the same kind of data is secured—well built stone cairns, usually in groups; burials generally in open country and not associated with mounds; skeletons extended in the graves and an entire absence of artifacts.

When we consider these data we are forced to conclude that we are dealing with a rather distinct group of people who perhaps represent a culture quite different from that of the other groups which we have discussed. When we further consider the outstanding characteristics of this group we are inclined to the opinion that they are less primitive than the others and perhaps approach in many respects modern man. This is indicated not only by their well-built and rather modern graves but by their skeletons and by the absence of the ornaments and artifacts so characteristic of the savage. And all of this reminds us of the theory to which we referred in an earlier chapter, to the effect that according to the Welsh tradition a colony of that nation reached the Mississippi Valley in very early times and remained there until wiped out or until it had become fused with the aborigines.

Fanciful as such a theory may be thought, we may at least consider whatever merits it may have at this point. In reviewing the arguments which have been advanced to support the theory we find some which are probably founded on fact. The first of these is the legend, which seems fairly well established in history that Prince Madoc of Wales in the latter part of the Twelfth Century, sailed westward with a number of his followers in ten ships and were never heard of again. This part of the tradition may perhaps be accepted without question. The second part of the tradition, namely, that this Welsh Colony entered the Gulf of Mexico, reached the mouth of the Mississippi, and established themselves somewhere in the interior of North America, may be regarded with more suspicion. The second is the rather well authenticated story that Indians were found in the United States in early days who spoke Welsh. One of the earliest of these accounts and one which has often been quoted is that of Lieutenant Joseph Roberts which was published in the "Public

Advertiser'' a Louisville newspaper of May 15, 1819. Lieutenant Roberts' report is as follows:

"In the year 1801, being at the City of Washington in America, I happened to be at a hotel, smoking a cigar according to the custom of the country and there was a young lad, a native of Wales, a waiter in the house, and because he had displeased me by bringing me a glass of brandy and water, warm instead of cold, I said to him jocosely in Welsh, 'I'll give thee a good beating.'

"There happened to be at the time in the room one of the secondary Indian Chiefs who on my pronouncing these words, rose in a great hurry stretching forth his hand, at the same time asking me in the ancient British tongue— 'Is that thy language? I answered him in the affirmative shaking hands at the same time, and the chief said that was likewise his language and the language of his father and mother and of his nation. I said to him, 'so is it the language of my father and mother and also my country.'

"Upon this the Indian began to inquire from whence I came and I replied from Wales, but he had never heard of such place. I explained that Wales was a principality in the kingdom called England. He had heard of England and of the English, but never of such a place as Wales.

"I asked him if there were any traditions amongst them whence their ancestors had come. He said there were and that they had come from a far distant country, very far in the east and from over the great water. I conversed with him in Welsh and English; he knew better Welsh than I did and I asked him how they had come to retain their language so well from mixing with other Indians. He answered that they had a law or established custom in their nation forbidding any to teach their children another language until they had attained the age of 12 years and after that they were at liberty to learn any language they pleased. I asked him if he would like to go to England and Wales; he replied that he had not the least inclination to leave his native country and that he would sooner live in a wigwam than in a palace. He had ornamented his naked arms with bracelets, on his head were placed ostrich feathers.

"I was astonished and greatly amazed when I heard such a man who had painted his face of yellowish red and of such an appearance speaking the ancient British language as fluently as if he had been born and brought up in the vicinity of Snowden. His head was shaved excepting around the crown of the head and there it was very long and plaited and it was on the crown of his head he had placed the ostrich feather which I mentioned before to ornament himself.

"The situation of those Indians is about 800 miles southwest of Philadelphia, according to his statement and they are called Asguaw Nation.

"The chief courted my society astonishing, seeing that we were descended from the same people. He used to call upon me almost every day and take me to the woods to show me the virtues of the various herbs which grew there; for neither he nor his kindred were acquainted with compound medicine."

A similar account appeared in the ''Palladium'' a weekly newspaper published at Frankfort, Kentucky on December 12, 1804. This account was written by the Honorable Harry Toulmin, Secretary of State under Governor Gerrard, and describes the experiences of a certain Maurice Griffiths who was taken prisoner by the Shawnees about 1764 and after living with the Indians for some years went on a hunting trip with a party of young braves. This party after a long and dangerous journey up the Missouri River finally came to a nation of Indians who were of a very light complexion and spoke the Welsh language.

Another account, of like nature, appeared in the ''American Pioneer'' in 1842 (Vol. I: p. 373). This was written by Thomas S. Hinde, an antiquarian of excellent reputation, who describes six skeletons found in 1799 near Jeffersonville, each of which had a breast plate of brass, each with the Welsh coat-of-arms, the Mermaid and Harp with a Latin inscription.

These accounts of Indians who could speak Welsh are so numerous and in many cases are from such reliable sources, that we must be very skeptical indeed to doubt their authenticity. A statement which we have secured on this subject and which is absolutely reliable is the following:

"My father, A. H. Ward, was born in Harrison county in 1815 and died in 1904. A lawyer, a member of Congress, a scholar when men had time to be scholars, he was always interested in history, and his unpublished Reminiscences are among my treasures.

"His father, Andrew Ward, was of Welsh descent. He was an Indian fighter serving under various enlistments from young manhood until wounded at Fort Meigs while serving in the Army of the North West Territory under General Harrison.

"He told my father *that he had met and talked with Welsh Indians, that they understood him and he understood them.*

(Signed) Mrs. W. T. Lafferty,
Head of Women's Division, University Extension. Chairman of History, Kentucky Federation of Women's Clubs.

State of Kentucky
County of Fayette

I, Mrs. W. T. Lafferty, hereby certify that the statement given above is correct.

(Signed) Mrs. W. T. Lafferty.

Subscribed and sworn to before me on this 18th day of February, 1926.

(Signed) Cella Taylor,
Notary Public.

My commission expires July 22, 1928.

We believe, therefore, that there can be little doubt but that there were American Indians in very early days who were

familiar with the Welsh language, so that this part of the theory must be taken seriously.

The third part of the theory has to do with the tradition concerning the "White Indians" who were supposed to have inhabited this part of the country in prehistoric times and who were destroyed at last by their enemies. Again we find facts to support such a theory which carry considerable weight. The first part of this tradition which deals with the long war of extermination between the Red Indians and the White Indians and the characteristics of the latter can perhaps never be verified or refuted. There is, however, no lack of evidence to indicate that even in comparatively recent times there were occasional individuals among the Indians who had light hair and blue eyes. Concerning the rest of the tradition which tells of the final battle at the Falls of the Ohio at which the White Indians made their last stand on Sand Island and were there entirely exterminated, there are a good many supporting facts.

There is no doubt that there was a battle, apparently involving a large number of warriors, fought at this spot, but of course what peoples took part in the fray we do not know. General George Rogers Clark, Colonel James F. Moore, John Filson, Daniel Boone, Levi Todd, James Harrod and other prominent authorities on early Kentucky history apparently believed that this battle was between a white and a red race but their sources of information were of course not absolutely authentic and their statements regarding the matter are in most cases quite vague. Chief Tobacco of the Piankashaws insisted that an entire white tribe were driven to the island and slaughtered. However that may be, the thousands of human bones which for many years were to be found there, and the multitudes of weapons which certainly were to be picked up around the Falls proves that there certainly was a great battle at this place at some long forgotten period in the past.

A fourth point to be considered, and one which bears directly on the subject of the stone grave people, is the fact that there are to be found in Wales ancient stone cairns very similar in construction to those found in the New World. Such a similarity might of course be entirely a coincidence, since this type of sepulcher would not be beyond the imagination of a primitive

race in any part of the world, but according to those who have examined the cysts both in Wales and in the United States, the resemblance between the two is quite remarkable and deserving of consideration.

We have, then, a very interesting series of traditions and facts which suggest associations. We have the migration from Wales, the traditional Welsh colonists in the New World and the characteristic Welsh stone cyst; we also have the American Indians who spoke Welsh, the legendary prehistoric "white race" in the Mississippi Valley and the stone graves in Kentucky, containing skeletons of rather modern type. It is therefore difficult to refrain from drawing conclusions which would tend to support the Welsh Theory.

Additional arguments which have been presented on this subject call attention to the fact that there have undoubtedly been found in this country objects which seem to indicate a European influence long before there is any historical record of the presence of Europeans on the American continent. It has been claimed that artifacts bearing Masonic emblems have been discovered in prehistoric sites; that certain Aztec designs are strongly suggestive of Old World artists; that the cliff-dwellings in the southwestern part of the United States would indicate an association with European culture; and, in fact, our own discovery in Kentucky of the Maltese Cross on bear's teeth and gorget are difficult to explain in any other way. All of which strongly point to the theory that there was some European influence in the prehistoric cultures in this part of the United States.

Such a supposition may be entirely fanciful but it is not entirely illogical and certainly not impossible. Could it be that the Welsh really were among the earliest of the known inhabitants of Kentucky and that they were the ones whom we are calling the "Stone-Grave People"?

CHAPTER X

THE USE OF BONE, SHELL AND HORN

In the discussion of prehistoric artifacts, any classification must necessarily be more or less artificial. Of the three methods of classification commonly used, i. e. classifying by cultures, by use and by material, we have adopted the latter as best suited to the description of the artifacts which we have found in Kentucky sites.

The first of the articles to be here discussed, therefore, are those made of bone, shell and horn since these can be grouped together conveniently and rather naturally and since they represent an extremely primitive type of handicraft.

It is to be expected that aboriginal man would find a variety of uses for bone, shell and horn, because such materials were plentiful in his day, and ready at hand. Prehistoric man was largely a meat-eater and as a hunter and fisherman his mode of life made it necessary that while taking his food from the bountiful hand of Nature, he must at the same time bring to his cave, cliff dwelling or village site large supplies of such material. Bone, shell and horn were therefore by-products of his daily struggle for existence, and accumulated in and about his dwelling in vast quantities. The magnitude of such accumulations in many prehistoric dwelling sites in Kentucky bears convincing testimony to the large numbers of individuals living on some of these sites, and again in limited areas conclusively shows that in the case of certain caves and rock shelters the length of time they were inhabited is to be reckoned perhaps in centuries and scores of centuries rather than in years and decades.

As an example of this, we have mentioned in a previous chapter the mounds along the Green River in Ohio and adjoining counties in which shell and bone accumulated in such vast quantities that mounds were formed which are even today eight to ten feet high, and cover areas varying from three to ten acres. The owner of one river farm stated that the mound on which his house, barns, and other outbuildings rested, had an area of some seventeen acres.

In the case of cliff and cave dwellers, investigation shows that in many cases the large accumulation of bone and horn in and about the cave often became an embarrassment to further occupation necessitating even in that remote day a "house cleaning." This was not caused by "a decent regard for public opinion" or because of a desire to follow the laws of sanitation, but from sheer inability of the cave entrance to contain any more camp debris. This house-cleaning was usually effected in the case of the cliff-dwellers by the simple expedient of pushing the accumulated bone and other residue over the edge of the cliff where it accumulated at the bottom in great piles. Being in the open, subject to the action of weather it of course gradually decomposed at the bottom as new material was added to the top of this talus. At least in one place under a cliff dwelling near Vine Grove in Hardin County, Mr. Hugh Yates thought it profitable to transport by wheelbarrow, the very rich accumulation of disintegrated bone and ash from under the cliff ledge to his tobacco field nearby, and greatly increased the fertility of a hillside patch of some five acres by spreading on it this accumulation of centuries.

Not only did primitive man have an abundant supply of bone, shell and horn, but the manner of his life gave him abundant opportunity to see the possibilities of such substances as raw material ready for manufacture into useful articles. He must early in his self education have learned by actual experience that any large bone when broken by a torque always "splinters," *i. e.* breaks longitudinally forming a number of long sharp pointed fragments. Such bone splinters would be, in the hand of primitive man, no mean weapon of offence or defense. Doubtless it was by actual use of such splinters that he first learned that the portion he had in his hand became smooth by use, and that the point could be improved by rubbing or scraping off the sharp corners. The knowledge gained that "bone could be worked," it was a comparatively easy step to develop the manufacture of bone knives, spear and arrow points, awls, and, perhaps later, ornaments. It is well known that such implements of bone and horn were made and used long before man knew how to grind stone or chip flint. In fact, it seems that the working of flint in the hands of primitive man

necessitated first the manufacture of some of the bone tools which are to be described later.

Again it is not to be wondered at, that primitive man should have learned to work shell and to manufacture shell objects of veneration, and to use shell material for personal adornment. Who has not, as a child, been attracted by the iridescent color of some fresh-water or marine shell found on the bank of stream or on the ocean beach, and been tempted, at perhaps some inconvenience to obtain the shell and carry it home? Ancient man, of necessity a close observer of nature, was not a stranger to this desire to possess the beautiful. Being limited in the number of materials which would allow him to express his desire it was very natural that he should turn to the use of shell because here was an inexhaustible supply of material so beautiful that in our day "shell pink" and "pearl gray" and such terms, have been accepted in our vocabulary as poetic expressions of fact.

We cannot doubt that early man made very beautiful ornaments of bone and shell. The beads, gorgets, hairpins, ear and nose ornaments and pendants after remaining hundred of years in ash heaps, graves, kitchen middens, in caves or in mounds, sometimes near the frost line, and often subject to slow decay, still show beauty of form and color, and often what must have been very beautiful carving. After such exposure to decay, to the chemical actions of soils, which often causes such artifacts to become encrusted with iron oxide, and to the chance for mechanical damage, such shell specimens must now be regarded as but the ghost of their former selves. Having in mind the beauty that some shell gorgets still retain, we get some idea of what must have been their pristine glory, when first made, showing the natural colors of the shell, with high polish, and engraved design, unmarred by time, decomposition or accident.

Artifacts may, in general, be classified, aside from their materials, as to their use, *i. e.* as to whether they were used for utility or ornamentation. For this purpose we may classify bone, horn and shell and objects made of teeth as follows:

For utility

(a) Awls.
(b) Celts.
(c) Scrapers.
(d) Flaking tools.
(e) Fish-hooks.
(f) Handles.

(g) Spear and arrow points.
(h) Bird calls and whistles.
(i) Hoes.
(j) Netting needles.

For ornamentation

(a) Beads.
(b) Gorgets.
(c) Pendants.
(d) Hairpins.
(e) Combs.
(f) Ear ornaments.
(g) Cut animal jaws.
(h) Animal teeth.
(i) Bone and other imitation of teeth.

It is appreciated that this classification may not be complete, and it is well understood that outside of our state are to be found many other artifacts made of such materials other than

FIG. 83. BONE AWLS.
Made from the ulna of the deer. Specimens found in Hines' Cave, in the clay Mound and in the Jamison Mound.

these classified above. However, the classification seems sufficiently general to include all such artifacts found in Kentucky.

Perhaps the so-called bone awls were the most important household tools used in the domestic life of early man. The awl was certainly used to pierce holes in skins and to lace them together with thongs. In this way tents, garments and moccasins were made. The awl in some cases may have served as a weapon, and certain awls seem to have been used as our modern forks, or rather as skewers, to lift cooked food from camp kettles, and

possibly were used to convey food to the mouth. The awl was expected to stand rather severe usage, and therefore the maker generally sought a hard bone of compact texture.

An ideal bone for such purposes was the ulna of deer or elk, not only because of its compactness but because the articulatory surface made an excellent handle. Awls of this bone are found distributed generally over the state and were used alike by cliff and cave dwellers, the river folk and the mound builders. Another hard bone suitable for awl manufacture was the cannon-

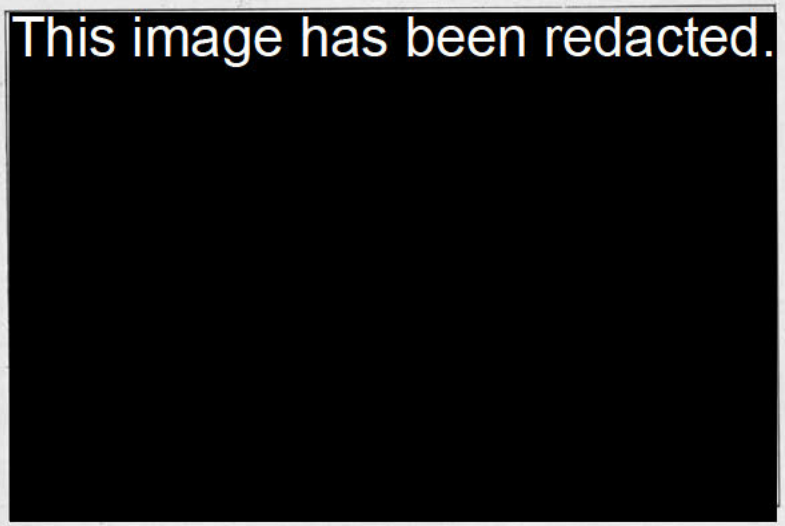


FIG. 84. BONE AWLS.
Made from the cannon bone of the deer. From the Yate's Cliff, Hardin County, Kentucky.

bone of the deer or other ungulate. This bone when split was capable of being worked into very efficient awls, taking on a very high polish.

A second method of converting the cannon-bone into an awl was to use the large end of the bone for a handle and cut away half of the wall, the remaining half being brought to a point. This type is well shown by the specimiens in Figure 84 all from Yates Cliff, Hardin County, Kentucky. Attention is called to those specimens in the figure which show the joint end of the bone still remaining and the specimen in which the end of the

bone has been cut off and the base of the awl beautifully decorated by cross-hatching.

Still another bone much used in the manufacture of awls is the tarsometatarsus of large birds, and in particular that of the wild turkey. Figure 85 shows a variety of such awls coming from the various localities. The largest specimen was taken from a kitchen midden at Fox Field and was made from the tar-

FIG. 85. BONE AWLS.
Made from the tarsometatarsus of large birds.

sometatarsus of some large bird probably the blue heron while the one immediately above it is from a wild turkey. The specimen on the lower right-hand corner of the figure shows decoration and notching.

Other special bones were used for awls. The longest awl shown in Figure 86 is made from the penis bone of the bear. Fish spines and ribs were often used as awls because they were already pointed, and were hard and compact in texture.

In the manufacture of celts for scraping and curing hides, and for other rough usage bone was often used. The third specimen in this figure is a typical bone celt. These are quite common, being reported by Smith, Milles, Moorehead and others from a

great number of sites. In general, however, bone must have been too soft to make an efficient scraper, which may account for the great predominance of stone celts, and for the fact that celts were made from the base of large horns. The upper right hand specimen in figure 87 shows celts made from the horn of the elk. The scraping edge in horn is much sharper and harder than bone even when hardened by heat which was often done.

Another form of scraper is not uncommon in Kentucky, and has been found in many places outside of our state. This is

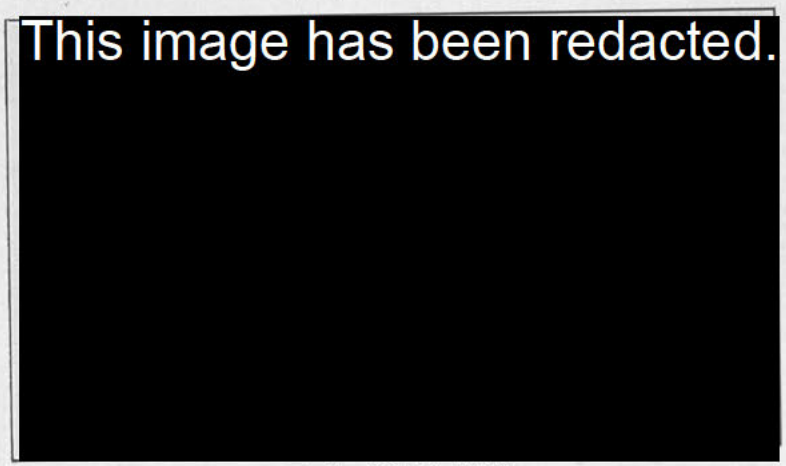


FIG. 86. BONE AWLS.
Made from fish spines and other small bones.

a type of scraper made from the metapodal bone of deer or other large mammal. The natural ends of the bone served as handles, it being a two handed tool. One half of the cylindrical wall was cut away for about half its length in the center and the remaining half ground to a nearly flat surface. Such a tool would have a double cutting edge and was doubtless used in a manner similar to a drawing knife, probably to dress and soften hides in the tanning process.

With a skin laid over a log such a double handed bone scraper would be a very efficient instrument. Excellent examples of this artifact are reported by Smith, from Fox Field, as made from the metapodal bone of deer. Another specimen taken from the collection of Hon. W. J. Curtis is shown in figure 87.

A very important tool of prehistoric man was the flaking tool made of a very hard solid bone or sometimes the tip of a horn. The manner of using this bone is discussed in the chapter on flint artifacts. The flaker is often found buried with the dead, and not infrequently is found in the hand of the skeleton. This has been interpreted to mean that early man attached great importance to this tool, and evidently felt that, provided with it in the spirit world, he would be able to make arrowpoints, spears, and other necessities.

These flakers besides being hard bone, are ground round at the ends and, before use, were laid in lye made from wood ashes to leach out all of the animal fat. This enabled the flaker to "take hold" of the flint when a chip was to be broken off by pressure Flakers vary somewhat in length but are usually found in two sizes. The longer ones, from three to four inches long, were held in the right hand and used to exert a steady pressure on a flint edge. The shorter variety varying from 1.5 inches to two inches in length seems to have been used as a mechanic uses a "drift." That is, one end was placed against

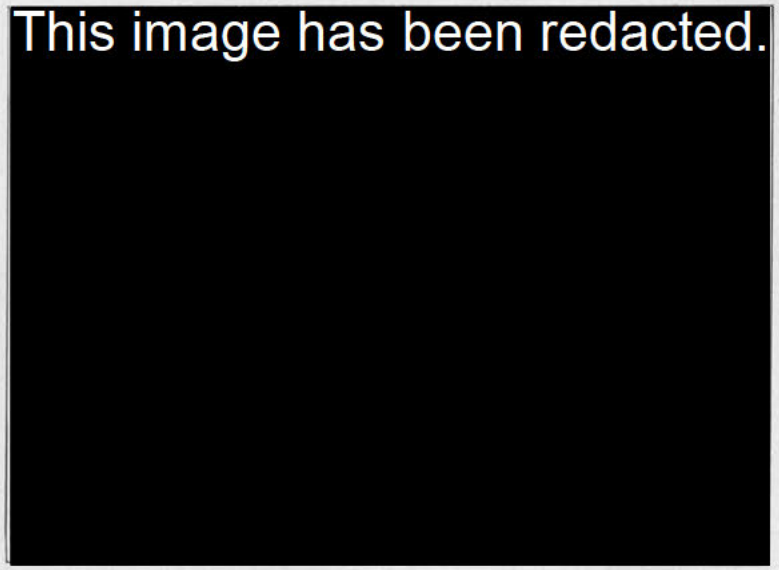


FIG. 87. CELTS.
Showing types made from bone and horn.

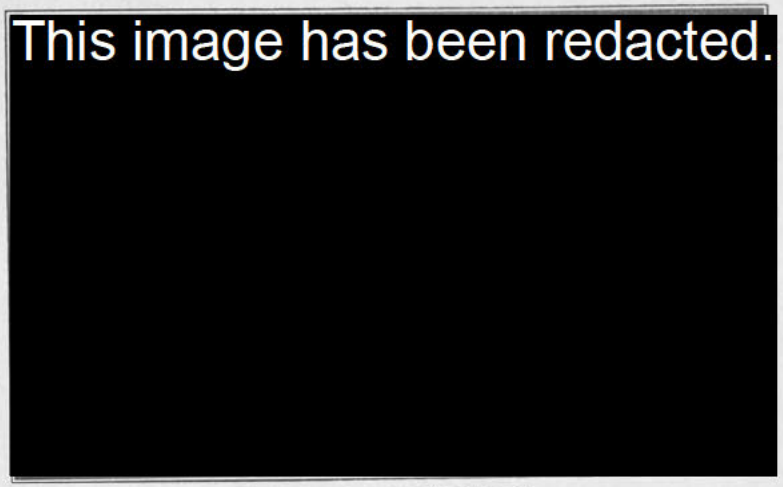


FIG. 88. BONE FLAKERS.
Used largely in the working of flint.

the flint edge to be chipped and when held at the proper angle the other end was struck by a hammer stone.

Thus the flint chip was broken off by a sudden blow rather than by steady pressure. That this explanation seems reasonable is attested to by observation that many of the shorter flakers, two inches long and under, show evidence of being hammered. There are many of them battered at the ends. Not only does this appear to be true of specimens collected by the authors but when any considerable number have been figured in other writings, many of the short specimens (and only those) show end battering.

Evidence seems to show that in certain sites outside of Kentucky the small flakers were sometimes hafted, by being placed in wooden handles. Sometimes these handles of wood were two or three feet long and fitted at one end with a cross bar of wood. This cross bar placed under the arm like a crutch, the bone flaker being mounted in the other end of the main shaft, enabled the entire strength and weight of the body to be brought to bear on the flaker and therefore on the flint chip to be dislodged. Perhaps such great pressure may account for the fact that so many flakers are found battered at the ends.

Horn and bone served primitive man very efficiently in the making of handles for flint knives. The first specimen in figure 87 shows a section of deer horn used for that purpose. The practice of "hafting" flint knives must have been very much more common than might at first be supposed. Many large arrow points and so called spear points show evidence of having been used as knives after handles had been attached. That bone and horn were used is shown by the finding of such handles wherever flint knives are found in caves or elsewhere under conditions such as to have preserved the bone. Even today the Eskimo makes and uses bone handles on his stone knives.

Closely associated with horn handles were the so-called "netting needles" made of horn, reported by Moore from Indian Knoll. These needles, made from a section of horn with a hook cut in one end were thought by Moore to have been handles for the net mesh spacers found with them, and to have been used in weaving fish nets.

The time when man first began to use the bow and arrow is lost in the distant past but it is considered established that at least among the Eskimos the earlier bows were made of bone. The bones used were either the ribs of a whale or shark, or the jaw bones of large fish. If early man did invade our continent by way of Bering Sea, it is highly probable that his first bows were of bone rather than of wood. At any rate early man used arrow points of bone and horn long before he used flint. However, it is not to be supposed that when he began to chip flint that he discarded bone and horn arrows altogether. In fact the reverse is the case. Some very early cultures of our state used only horn and bone points. Later peoples used both horn and bone points and still others flint arrows entirely. In general the presence of arrow and spear points of bone and horn is to be regarded as evidence of rather primitive culture though not necessarily a very ancient one.

Figure 89 shows a variety of arrow points made from the tips of deer horns as well as tips cut off ready for manufacture, but still incomplete. There is also shown the remaining butt end of the horn which tells its own story. The deer was probably killed far from the village or camp and the tip end of the horns roughly broken off. Later, by the use of a sharp knife probably

of flint, a notch was cut around the horn at the proper place and the tip to be worked was broken off from the rough stump. This gave or was intended to give a fairly smooth base to the tip. A conical hole was then reamed out of the base to receive a pointed shaft to which the horn tip was probably attached by means of pitch or resin, or as has been found in some cases by asphaltum. It has been suggested that in the case of the use of such arrows for purposes of war, the tip was intentionally not very securely

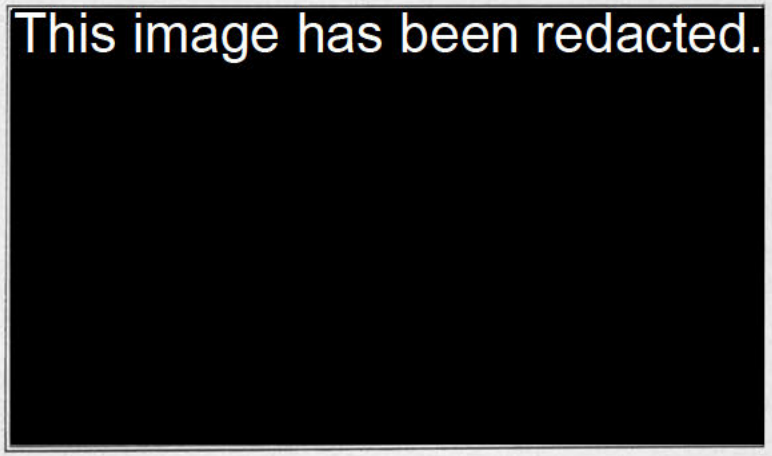


FIG. 89. ARROWPOINTS AND SPEARPOINTS.
Made from tips of horn and showing barbed, drilled and square bases.

attached to the shaft. Thus should the arrow reach its mark, the victim when attempting to withdaw the shaft would leave the point in the wound. That this is not fanciful, but actually did occur is abundantly proved by finding single arrow points and spear points with and in some cases embedded in the bones of skeletons.

Moore found in his excavation at Indian Knoll a spear point securely caught between two sections of the spinal column of a skeleton. In some cases however, as seen in Figure 89 the tip is drilled in the side, evidently to receive a pin for attachment to the shaft. It is to be noted that some of the finished points are cut square off and are scraped to a thin edge at the base, and are very sharp at the point. Others are cut off obliquely at the base and are so scraped that the basal edge acts like a barb

Perhaps here is to be found the distinction between the war arrow and the hunting arrow of primitive man. The sixth specimen in figure 89 shows a beautiful spear point from Fox Field, quite similar to the one reported by Moore.

Among the many other artifacts made of bone might be mentioned bone whistles or turkey calls. These are not very common, probably for the reason that they were made from

FIG. 90. SHELL AND BONE UTENSILS.
Shell spoons, shell hoes, bone whistle and bone fish-hook.

the small bird bones easily broken, and soon destroyed when exposed. These whistles vary from three to five inches in length and have from two to six well drilled holes about three fourths of an inch apart. The one shown in Figure 90 is from Fox Field and Smith figures many from the same site.

Fish hooks were made by early man by cutting a large bone obliquely. This practice seems to have been common throughout the whole Ohio River valley. Many have been found about the Ohio River at Louisville and Col. Bennett Young figures a variety of forms. Such hooks however are not common in excavations now, for their ability to withstand decay is very slight.

Fish hooks made from the teeth of deer or elk are found occasionally, and in a fair state of preservation. These are very carefully worked out and show much ingenuity. The fish hook shown in Figure 90 is a four pronged hook found on the Ohio River near Maysville.

Shell hoes are not uncommon in Kentucky. They seem not to be peculiar to any location or culture. Such hoes are usually made from a very heavy mussel shell, a hole being broken in the center for attachment to a handle. Many specimens show wear, and evidently have seen considerable service.

Evidence is plentiful that in many villages and camp sites food was cooked in large pottery kettles. Probably the usual way to lift food from these pots was to use the valve of a large mussel as a spoon. Shells by long usage became worn on the edges, and show evidence of scraping on the pot walls. The shell generally selected was some long, slender variety of Unio and by use it developed a characteristic point and edge. Such shell spoons shown in Figure 90 are from Fox Field and from Reed's Cave.

Bone and Shell Ornaments

The ornaments of early man were largely made of shell, bone and the teeth of animals, although stone played a considerable part in decoration and even pottery was sometimes used. It seems certain that in the primitive mind, ornamentation served two distinct purposes. First, ornaments such as hairpins, beads, ear ornaments, and pendants were worn as personal decorations. Second, gorgets, engraved pendants and animal teeth which were also engraved had a religious and ceremonial significance. This last class of objects being objects of veneration, were in many cases very carefully wrought, and were naturally buried with their owner at his death. By far the most common type of personal ornaments were beads, some quite small and delicate, others with the individual bead several inches long.

Bone beads were made by taking a long bone having the proper sized central hole and cutting it into sections of the desired length. This cutting was probably done with a flint knife. In Figure 91 a variety of bone beads are shown together with a bone marked off into sections cut nearly through. Before the final separation of the bead the free end was polished by rubbing,

using the bone from which it was to be cut as a means of holding it. Thus many bone beads show a very decided difference in their two ends. One end is well polished being the free end, the other end is left much rougher, being the end last cut off, and thus difficult to hold. After beads were worn for a long time, especially the larger ones, they show the result of rubbing together, which often renders them nonsymmetric, a non-symmetry which was evidently not produced in their manufacture. In one restoration we have a string of beads made of bone, taken from an extended burial in Fullerton Field. These beads vary

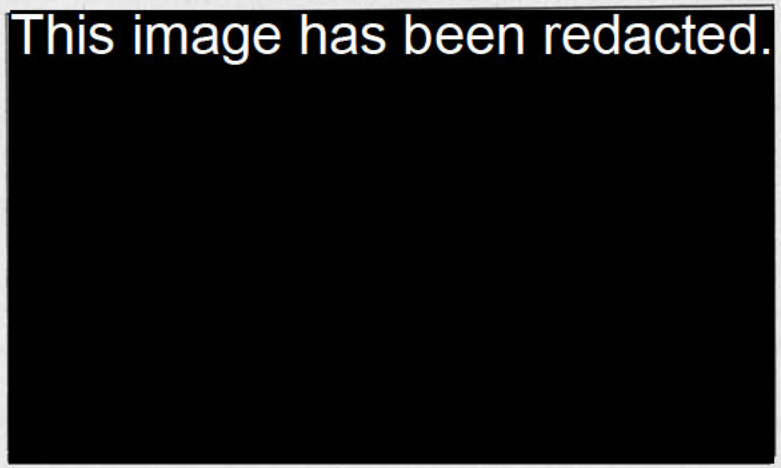


FIG. 91. BONE BEADS.
Showing various types from prehistoric graves. Specimen 354 is a notched bone showing the beads ready to be broken apart.

greatly in size and degree of polish and are but a small remnant of the personal decoration of this woman. Only some 113 beads could be restored. There probably were originally as many as 500.

It is to be noted that some of these beads were made from very thick walled bones having almost a square cross-section. Others were made from thin walled bones of circular section, still others from nearly flat bones suggesting the ribs of deer. These last were drilled non-symmetrically through the thick edge. A few of this group were double drilled. This last type has been reported at least once before from Kentucky, Hon. Wm. J.

Curtis having in his private collection specimens from Fox Field. Some of the beads shown in Figure 91 are from the Clay Mound, Nicholas Co., and are interesting from the fact that they are rather long as compared to the diameter of the hole drilled through them, and are almost triangular in cross section.

One of the most beautiful forms of large beads doubtless worn on a leather thong were those made from the large central column of marine shells. The use of such shells seems to have been quite common among all southern peoples on the Gulf and

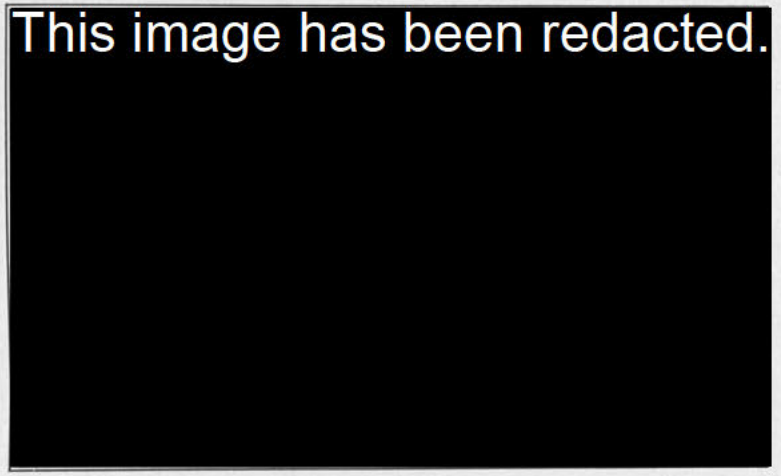


FIG. 92. SHELL BEADS.
Made from central column of marine shells.

Atlantic coasts, as shown by the excavations of Moore. That early man had intercourse with the sea either by trade or travel is proven by the presence of quantities of these large beautiful beads. Figure 92 shows the personal decoration of one man from Fox Field.

Shell beads were made in great quantities from flat disks cut from mussel shells. These disks vary greatly in size and thickness. In Figure 93 is shown a string of very small beads which composed the bead "skull cap" of the individual buried as a bundle burial in the center of the Clay Mound, Nicholas County, previously described.

These beads were probably not strung on a string but sewed on some fabric. Another very common form of bead is made from the fresh water olivella. These small shells were abundant in the streams of Kentucky and could be converted into beads by rubbing on a flat stone till a hole was worn in the large end.

FIG. 93. SHELL BEADS.
The first string was found about the arms of a skeleton the shells in the second were from the head-dress of a skull—both from the Clay Mound.

They were probably sewed on fabric, and not used in strings. These shells are all about .35 inches long. Another smaller species (marginella) was also used, as shown by the small string from Hines Cave.

Another fresh water shell, *Oliva litterata* Lamarck, about one inch long was often used. Another use of fresh water shell appears in the graves in Hines Cave. The second row in figure 94 shows a group of these shells. They were not drilled and could therefore not have been strung but the large end of every one has been slightly worn off indicating some use. It has been suggested that a small slit was cut in a leather strap or garment

and such shells were screwed into the slit. That they could be held securely in a leather strap can be ascertained by trial today. They may have thus been used for ornaments without having been made into beads in the true sense.

Besides the recognized types of beads there is a great variety of worked shell forms which were evidently sewed to clothing or worn in association with beads. The third row in Figure 94 shows a variety of such forms. Their variation in shape seems to be endless, and while as a class they are fairly numerous, generally no two are alike and they probably represent the varied tastes of different individuals.

FIG. 94. TEETH AND SHELL ORNAMENTS.
Showing the unworked teeth of bear and wolf and the oliva, olivella and marginella shells used for beads.

Closely associated with the use of beads and many times found in connection with them are the various forms of pendants. Sometimes a single pendant forms the center of a string of beads. Sometimes a string of pendants forms a collar about the neck of the skeleton.

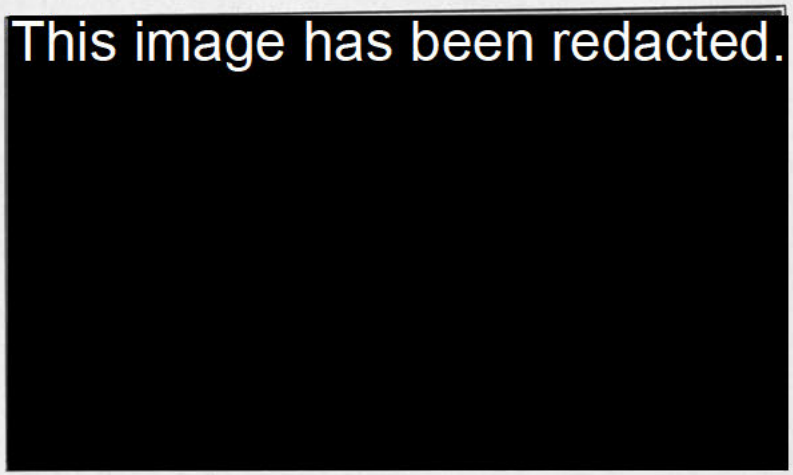


FIG. 95. SHELL DECORATIONS.
Necklace of shell pendants, ear ornaments and hair-pins.

Figure 95 shows a string of such pendants made from river mussel shells, if we may judge from the thickness and curvature. These fourteen pendants formed a collar on one (headless except as to lower jaw) individual in the Clay Mound, as previously reported. Figure 96 is a group of much more delicate pendants from a single grave in Fox Field. The drilling of the holes in these pendants is remarkably well done, in several of

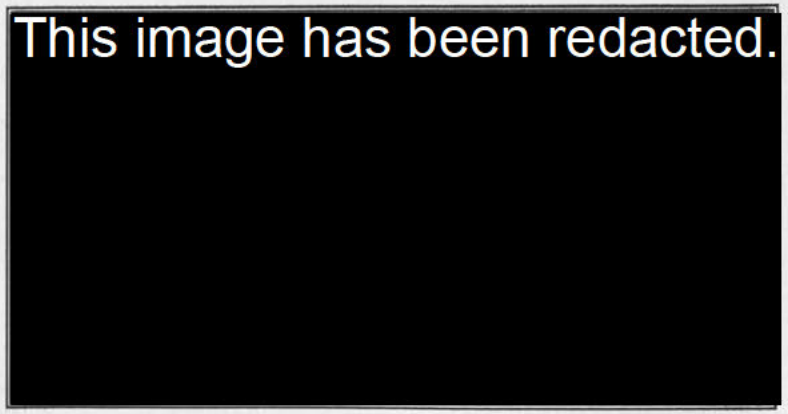


FIG. 96. SHELL PENDANTS.
Necklace of shell pendants from Fox Field.

them the hole is parallel to the face of the original shell from which the pendant is cut, rather than perpendicular to the shell face as would seem to be the natural way to drill such objects.

Pendants vary greatly in form and probably often had ceremonial or tribal significance. Figure 97 shows two pendants from the same grave in Fox Field which may represent animal claws as suggested by Smith who reported pendants from this site of identical form. The same figure shows two crescent pen-

FIG. 97. PENDANTS AND DISKS.
Various forms of ornaments made from shell and bone.

dants from Fox Field similar to those reported by Smith who has to say of this site:

> "The inhabitants of the village site were apparently the builders of the mounds as indicated by the similarity of the artifacts found in each. It will be remembered that the inhabitants of the Gartner Village were the builders of the mounds there. Shell crescents were found here in Kentucky and it will be remembered that Mills states the Baum site differs from the Gartner site only in the absence of shell crescents."

Pendants of bone, though rare, were sometimes made. One from Fox Field is shown in Figure 97.

By far the most ornate and perhaps the most treasured of the personal ornaments of primitive man were the so called "gorgets." They were made from a variety of stone, sometimes

of beaten native copper and often of shell. The connection by trade or travel with the sea seems to have furnished the early Kentuckians with quantities of large marine shells from which large disks of almost flat surface could be cut. Some of these flat disks are as large as eight inches in diameter and from such disks in varying sizes shell gorgets were made. The plain gorget was usually drilled with two holes near the rim of the disk. Through these holes a thong of leather passed which was used to suspend the gorget over the breast of the wearer. The concave side of the original shell was usually worn outward from the breast. These simple gorgets were generally circular in outline and their edges very smoothly ground. Sometimes a central hole was drilled and from this hole a string hung down to carry beads or pendants below the gorget.

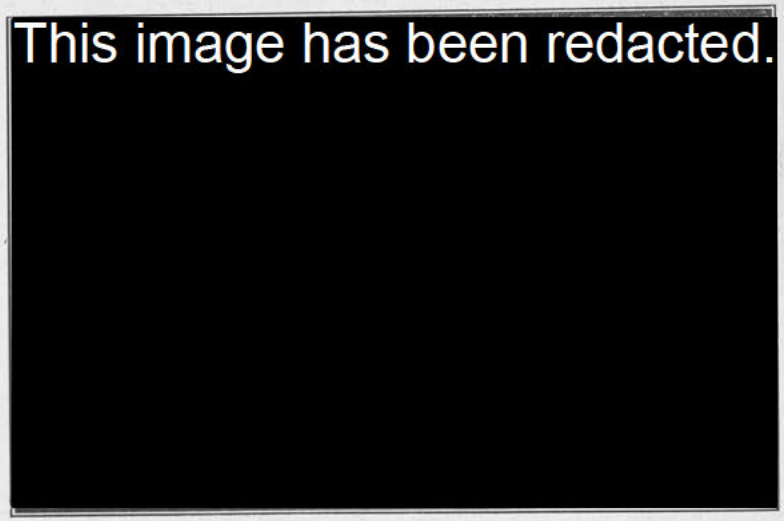


FIG. 98. GORGETS.
Shell decorations with holes for suspension. Note the rattlesnake design on the center gorget in the lower row.

Figure 98 shows typical gorgets of the simple type taken from the Clay Mound, one with a rattlesnake design, and figure 99 shows a large plain gorget from Fox Field made of a marine shell with beads. As has been suggested the gorget gave opportunity for primitive man to display his ability as a craftsman

in engraving his gorgets, and again it allowed him to display his symbols of veneration, charms and totems as indicated in the rattlesnake motive on the gorget from Fox Field.

Another gorget from the same field, having been broken when the field was plowed, and the remainder destroyed or lost,

FIG. 99. GORGET AND BEADS.
Representing shell and bone decorations from Fox Field.

shows a characteristic type of scalloped edge. This fragment also shows the incised decoration known as the "triskele" frequently found in East Tennessee as well as Kentucky and usually associated with the known ancient or pre-Cherokee culture. Such gorgets of great beauty were reported by Harrington from Hiwassee Island near Dayton, Tennessee. On this point Mr. Harrington in "Cherokee and Earlier Remains on the Upper Tennessee River," 1922, Heye Foundation, states:

"As might have been expected, most of the pendants found were made of marine shells; one had been a fine circular gorget with scalloped edges on whose disintegrated surface may still be seen traces of an incised decoration, the "triskele" frequently found in eastern Tennessee. We were not successful in procuring any examples of the mask type of shell gorget, also well known, from this region, but a number of good specimens of these were found by Messrs Barnes and Benham during their digging on Hiwassee Island, some of which may

still be seen in Lieutenant Benham's collection, along with a well preserved specimen of the "triskele' gorget.

Whatever other people or peoples may also have used the triskele, mask, and rattlesnake types of shell gorgets, the writer is convinced that the Cherokee owned and wore many of them, whether they actually made them or not. His reason for this belief lies in the fact that not only were they discovered in Cherokee graves by Messrs. Barnes and Benham, but that Mr. Moore found them associated with a series of artifacts, which the writer from his own studies considers typically Cherokee, on a site near Citico Creek in the vicinity of Chattanooga; and MacCurdy reports them so associated at the Brakebill mound near Knoxville."

It is interesting in this connection to note that the mask type of gorget referred to in this quotation is not unknown even in northern Kentucky. Figure 100 shows a splendid specimen from the Fox Field.

FIG. 100. MASK GORGET.
A remarkable type of engraved gorget from Fox Field.

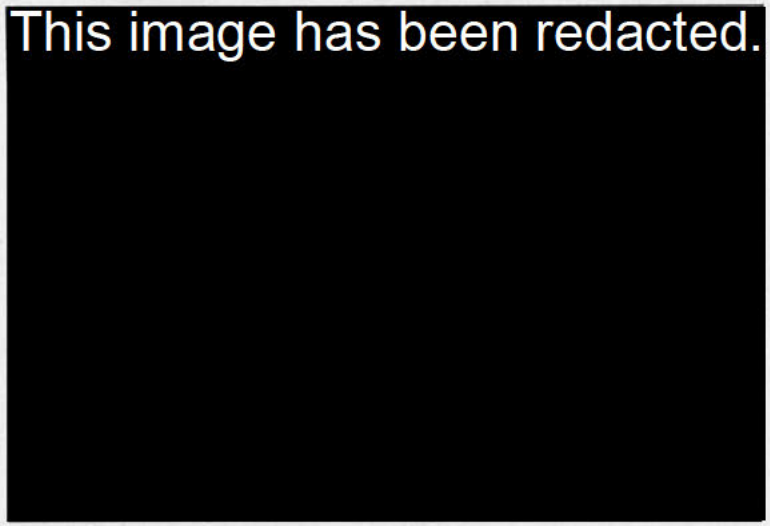


FIG. 101. MASK DESIGNS.
Gorgets and pipe with a peculiar mask motif.

This gorget is made from a section of a marine shell and very carefully engraved. It is heavily encrusted with oxide of iron from the soil, but the mask engravings still remain. The mask effect is obtained by grinding the shell in the general outline of a mask and on the convex face of the shell grinding off the surface to leave a prominent ridge down the center, which is evidently intended to represent the nose. The eyes are drilled holes, about each of which is a very peculiar figure which may have a significance suggested later. Many shell ornaments such as are shown in figure 101 seem to be replicas in miniature of the mask gorget. While it is granted that this mask form may have been used by the Cherokee and pre-Cherokee culture as suggested by Harrington, yet the mask motive is found in locations difficult to classify as Cherokee.

It may be interesting at this point to observe that figure 102 shows three gorgets made of the carapace of the box tortoise, each carefully ground and drilled with four to six holes. These gorgets were found on the breasts of one of two skeletons in a cave near Burnside, Pulaski County, Kentucky. Through the kindness of Mr. F. E. Bradshaw, cashier of the bank at Burn-

side, we obtained this record and the artifacts which are as far as the authors are aware the only gorgets made from the carapace of the box tortoise ever found in Kentucky. It is to be observed that here again in one of these gorgets we have the mask motive, *i. e.* a ridge for a nose, holes for eyes, and the general outline of the mask which happens to be in this case the natural outline of one section of the carapace. In this connection there has been shown in figure 101 a sandstone pipe typical of the Fort Ancient culture of northern Kentucky which again shows a ridge for a nose, holes for eyes, but most significent of all exactly the peculiar engraving about the eyes as appears on the mask gorget. This certainly can not be accidental. What the significance is can not be certainly known, but the figure strongly suggests the sex worshipers and may have a religious rather than a racial significance.

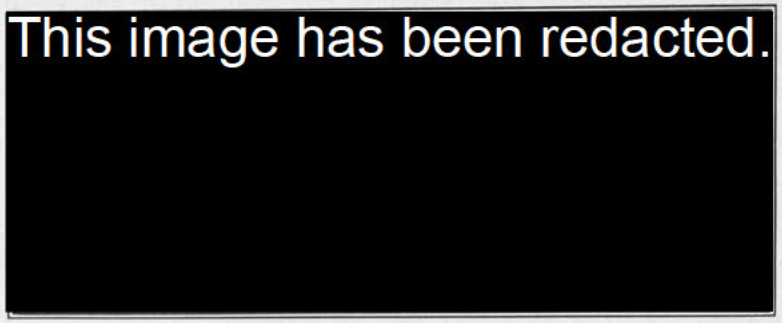


FIG. 102. SHELL GORGETS.
Made from the carapace of the box tortoise.

In addition to the large plain and decorated gorgets, described above, there are many small gorgets which might have been made from fresh water mussel shells. There is a variety of forms in these small gorgets and they occur over widely distributed areas. They are well made, carefully drilled and are usually found on the breasts of skeletons as if they had been suspended from the neck. Besides gorgets made of shell, bone was used where it was possible to obtain a flat bone of sufficient size. Reference has already been made to the gorget constructed from a human skull found at Fullerton.

Ear ornaments of shell appear in two forms in Kentucky. Figure 95 shows two shell disks taken from a skeleton in Clay Mound as previously reported. One of these disks was on each side of the lower jaw, the drilling would indicate that they were probably suspended from the lobe of the ear. A second type, common to the pre-Cherokee, is of the form of a shell pin several inches long, pointed at one end and terminating in a knob at the other. This type has been reported by Smith from Kentucky,

FIG. 103. ANIMAL-TEETH PENDANTS.
Teeth of various animals pierced and carved for use as ornaments.

by Harrington from Tennessee, and by Moore from Alabama and Florida. The Indian evidently slit the lobe of the ear and inserted the large shell pin, the knob pointing upward to the front and outward held the pin from slipping through the ear. A form of bone ear ornament was also used; figure 95 shows a pair of bone tubes about three inches long cut off square and the ends highly polished. These were also to be inserted in slits in the ear.

Hairpins made from long slender bones have been reported by Moore from Indian Knoll and figure 95 shows the remnants of a pair of bone hairpins found by the authors in the Clay Mound.

A very important item in the personal adornment of prehistoric man is the use made of the teeth of animals, especially the canine of bear and wolf, the incisors of elk and deer, and occasionally the molars of other animals. In general these teeth were drilled at the proximal end and used as pendants. Often these teeth were deformed from their natural elliptical

FIG. 104. CURIOUS NECKLACES.
An interesting type consisting of teeth and bone beads.

cross section by grinding to flat faces and again are often found engraved with incised lines in groups. Such engraved teeth were reported by Smith from Fox Field and figure 103 shows specimens from the same site. Animal teeth were worn singly, as pendants, or in groups of two or three or four in a cluster. When so used all the teeth of the group were similarly engraved. Occasionally a large number of undecorated teeth were used, evidently strung on a thong with a bone bead about an inch long alternating between the teeth. Figure 104 shows this arrangement made from the canine teeth of small animals and the incisors of deer. Such a string ornament was worn as a collar and always bound rather closely about the neck of the individual.

In Figure 103 is shown a group of three bear teeth similarly engraved from a grave in Fox Field, and the bear teeth engraved with the so-called Maltese Cross from the same site, have already been described in a previous chapter.

Besides animal teeth drilled as pendants a great many teeth were used with no drilling. Sometimes a groove was cut at the basal end which served the same purpose as a hole. Often, however, there are found in graves many animal teeth which show no working whatever. Their presence may mean that they were used as offerings to the dead at the time of interment or they were placed there to be converted into ornaments by the deceased when he should reach the spirit world. It is difficult to see how teeth unworked in any way could have served any purpose of ornamentation or utility.

A collection of such teeth of bear and wolf, all taken from graves, is shown in figure 94. Great interest attaches also to the finding of many canine teeth of bear, which have been cut in half transversely by grinding, the basal end being missing. Such findings are common, being reported by Moorehead from the Hopewell Group and by Smith from Kentucky. Such a very hard substance as the canine tooth of the bear would require a large amount of labor to cut, even with modern tools and must have been for primitive man a huge task. The fact that such cut teeth were comparatively common at once raises the question as to why they were cut and the equally interesting question as to how they were used after being cut.

It is thought that the finding of the upper bear jaw gorget at Fullerton Field, in the summer of 1926, as reported in chapter V gives not only the reasons for the cuttings but shows the method used. These cut teeth have long been a matter of speculation among archaeologists but we believe that when such cut teeth are found singly they represent the remains of a bone gorget, the bone tissue of which has long since decayed. Cut wolf jaws, previously described from Fullerton as forming a head dress, is a type of ornament closely related to the bear jaw gorget. Such gorgets were cut from the upper jaws of the bear while the wolf jaws, forming the head dress from both the upper and lower jaws. Such cut jaw ornaments have been reported pre-

viously by Mills. Figure 104 shows the jaw of a small cat taken from the general digging of Clay Mounds in Nicholas County, Kentucky.

In concluding the chapter on the use of bone and shell the discussion would be incomplete if attention were not called to the use of other materials to manufacture imitations of artifacts discussed in this chapter. In particular cannel coal, pipestone, (catlinite) and bone are often used to make imitation teeth. These black (coal), red (catlinite) and white (bone) teeth were

FIG. 105. IMITATION TEETH.
Made from cannel-coal, bone and catlinite.

evidently used along with the real teeth in forming collars, and must have added much to the color scheme of personal adornment. Figure 105 shows a group of cannel coal teeth with several catlinite and a few "bone" teeth. Some of the cannel coal teeth are engraved with the same system of parallel lines and cross lines as are incised on large bear tooth pendants. This propensity for imitation seems to have been shown only in the Fort Ancient culture group and is therefore very common at Fox Field.

CHAPTER XI

CHIPPED STONE ARTIFACTS

Stone artifacts, for the purpose of this discussion, will be considered under the two usual major divisions, i. e., (1) chipped implements and (2) ground implements, and in this chapter those artifacts made by the chipping, breaking, or cleavage of stone, will be briefly discussed. We are using the term "implement" in its broadest sense to include tools for known purposes, ornaments of known use, and problematical or ceremonial forms, the use of which is either wholly unknown or admittedly quite uncertain.

The chipped stone artifacts commonly found in Kentucky may be roughly classified as follows:

a. Flint blanks
b. Knives
c. Spearheads
d. Arrowpoints
e. Drills
f. Harpoons and hooks
g. Hoes
h. Scrapers
i. Celts
j. Disks
k. Hammer-stones

This classification does not, of course, include all artifacts of this type which are known to have been used by prehistoric man here and elsewhere but lists merely those which we have found most commonly in this state. Exceedingly rare and unusual specimens have been omitted from this classification and will be discussed in a later chapter on miscellaneous artifacts.

The manufacture of chipped implements by primitive man is inseparably connected with the process of quarrying the material from which the implements were made. Investigation has shown that quarrying with very primitive tools was carried on quite extensively in certain areas in Ohio, Tennessee, Virginia, and elsewhere, and that the products of these quarry operations, were carried hundreds of miles from these quarries, before being reduced to finished form. While there are numerous quarry sites on this continent which were used extensively, in general they are all of one or the other of two types. In one, primitive man obtained pebbles and bowlders of quartz, quartzite and other similar material, either from present river gravel beds, or

from conglomerate strata containing such pebbles, laid down in geological ages past.

The operation of quarrying was comparatively simple, consisting in the main of gathering such bowlders, on the surface when exposed, or digging for them in the earth. In some cases primitive man attacked the strata containing the pebbles, and excavated the softer strata to obtain them. However, investigation shows he made use largely of pebbles which weathered out and fell as talus at the foot of cliffs. Many such quarries have been investigated, and those reported by Holmes in the Potomac-Chesapeake tide water region of Maryland are very typical.

After obtaining quantities of bowlder of the desired material, and proper size, these were assembled at one place, and by striking with a similar stone used as a hammer, flakes were broken off, reducing the bowlder to a so-called "turtle-back." That is the flakes breaking off usually with a conchoidal fracture, were removed by striking the bowlder at points all the way around its circumference, leaving one-half of the original surface of the bowlder on one side. If desired, flakes could then be broken off so as to cover the other side of the bowlder, and reduce it to a "blank"—that is the blank was now rough but fairly thin, and capable of being further worked to the desired form by further percussion, or by pressure.

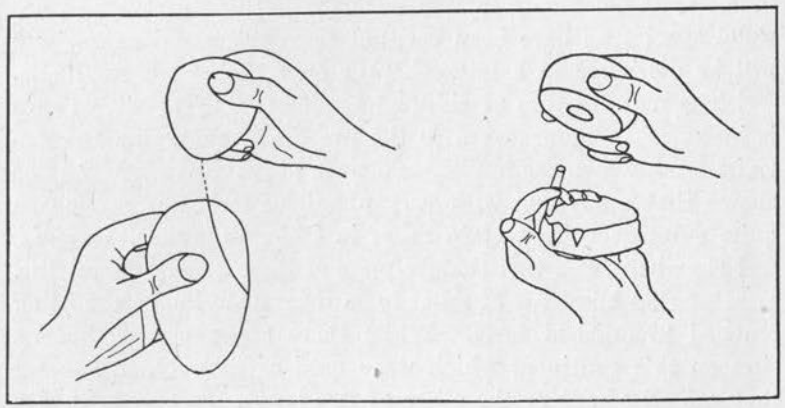


FIG. 106. METHODS OF CHIPPING FLINT.

The figure on the left illustrates flaking by direct percussion; that on the right the method of flaking by indirect percussion.

This process of rough flaking to form blanks was accomplished near the actual quarry site, and sometimes within it, probably to save the labor of transporting useless material. Bowlders which did not break properly, and all material spoiled by the lack of skill of the artisan, together with flakes broken off were left on the site as rejects. This partially worked material has accumulated in vast quantities in these quarry areas, and such accumulations have been spoken of as "quarry shops." The products of such shops were rough blanks suitable for transportation to long distances before being finally finished. The two left hand specimens in figure 108 represent such blanks.

The other type of ancient quarry for obtaining material for chipping, is well represented by the great Flint-Ridge Quarry of Ohio, investigated by Mills. Here primitive man attacked natural deposits of flint in strata a foot or more thick. The quarry operation consisted in exposing a portion of the strata by digging a pit. A fire was built and when the strata had been heated, water was thrown on the hot exposed flint, causing it to crack and splinter. This process was continual till a hole was worked in the deposit, and the face of the flint ledge was exposed. Then by the use of crude tools as picks, the softer material under the exposed flint ledge was dug out and removed, leaving the flint uninjured by fire, not only exposed, but actually overhanging. By the use of large hammerstones, some about the limit of a man's ability to lift, portions of suitable size were broken from the ledge. These portions were removed only a short distance from the quarry to the "shop" where they were worked into blanks of suitable size for transportation. Again such shops are marked by a great accumulation of flint chips and by rejects.

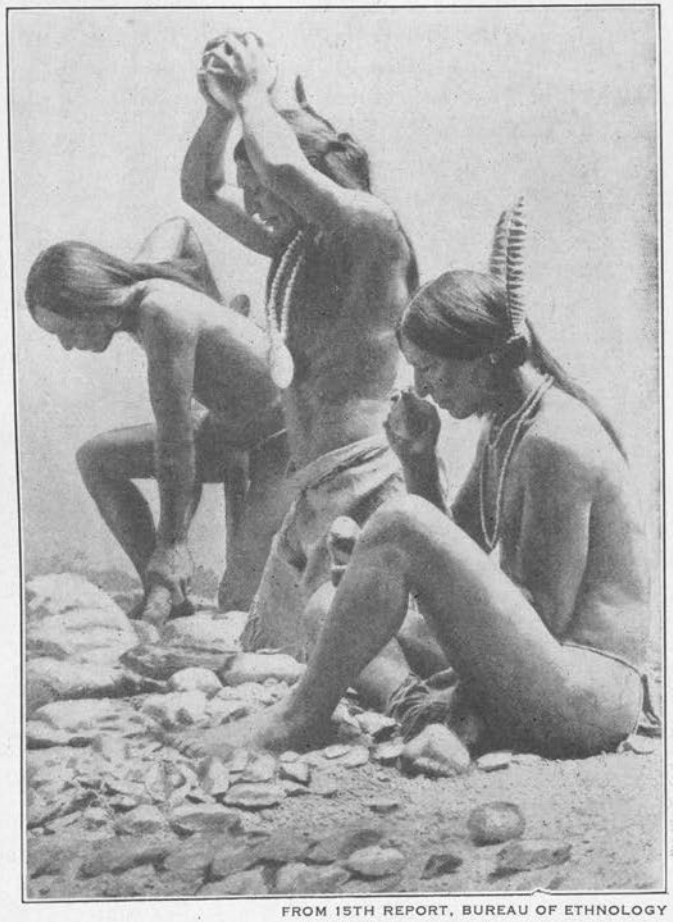
The flint blanks from such quarries, as well as quartzite and quartz blanks from bowlders became an article of trade among the different tribes, and such supplies were transported long distances. Often great quantities of such blanks have been found in a single cache, which seems to indicate that they represent wealth, the result of labor, trade, or travel, and when procured in quantity were stored as against a future need.

While many caches of flint discs or blanks have been found, the largest was reported by Moorehead as taken from Mound No. 22 of the Hopewell Group, of Ross County, Ohio. From this mound, Moorehead reports 7,350 discs taken at one time (1891). Previous removals by early explorers, in 1845, in this same mound would seem to indicate the total number to have been not far from 8,500. Of the cache Mr. Moorehead has to say:

"These discs represent a storage of raw material. The discs were not placed in that mound as an offering. There were no burials and no altars. Many years later I discovered the quarries on Little River, Tennessee, 18 miles south of Hopkinsville, Kentucky, whence I am persuaded this flint was obtained. It was of the nodular variety, gray-blue in character, and could be easily worked. The quarry showed signs of extensive working. After a thorough investigation I concluded that the ancient people had quarried this flint, worked it down to convenient disc form for distribution, and taking it in canoes down the Little River to the Cumberland, down the Cumberland to the Ohio, up the Ohio to the Scioto, and thence to North Fork of Paint Creek, landed it one-half mile from the Hopewell village. The distance by water would be 700 or 800 miles, as near as I can judge. If the material was not brought in this manner, it must have been obtained by trade, and one can scarcely conceive of over eight thousand discs weighing from ¼ to ⅔ of a pound, each being carried overland on the backs of Indians from Northwest Tennessee to Central Ohio."

This quotation illustrates the fact that while there are no extensive quarries known to have been used by primitive man in Kentucky that will compare to the Little River quarries of Tennessee, Flint Ridge of Ohio, or the Tidewater quarry of Maryland, yet the traffic in flint discs, as raw material, did undoubtedly take place in Kentucky as elsewhere. In the Kentucky caves, there is an abundant supply of bedded flint deposited in strata quite sufficient in size to have been worked. There is also to be found over a considerable area in southern and western Kentucky, the outcrop of limestone strata containing concretionary flint.

These concretions, being much harder than the remainder of the limestone strata, are released by weathering, and are to be found in great quantities on the surface where such strata outcrop. Such concretionary flint breaks with the typical conchoidal fracture, a characteristic of the vast majority of flint artifacts in Kentucky. Again, the concretions being formed in layers about the center, the successive layers are often of different color. Such circular "eye spots" shown by flint blanks as



FROM 15TH REPORT, BUREAU OF ETHNOLOGY

FIG. 107. AN ABORIGINAL QUARRY WORKSHOP.
A group designed by W. H. Holmes for the Columbian Exposition.

well as artifacts definitely prove the source from which they come.

The method of quarrying bowlders of quartzite, fracturing by hammerstones, and reducing the quarry product to "blanks" suitable for later specialization, is well illustrated in figure 107, which is a plaster group prepared by William H. Holmes for the World's Columbian Exposition at Chicago. The figure is copied from the 15th Annual Report, Bureau of Ethnology.

Figure 108 illustrates the quarry product. Some of these flint blocks show the center of the concretion from which they were split. There are shown beside them several finished arrow points which also show the form of the concretion.

FIG. 108. QUARRY BLANKS AND ARROWPOINTS.
Rough blanks and finished points made from flint concretions.

The manner of working these blocks into specialized form has been mentioned in the chapter on bone artifacts. The principal tool used in this last stage of manufacture was a "bone flaker." This flaker was about 3 to 4 inches long of very hard, compact bone, free of grease. When in use it was grasped in the right hand, the flint block being held in the left, the hand being covered with leather to prevent cutting by the flint chips. (See Fig. 109.) The flaker was placed against the edge of the flint blank and upon pressure being brought to bear with the right hand flakes were dislodged. This art of finishing the

knife, arrow point, or spear head, by delicate flaking by removing very small regular chips, reached a very high state of perfection in Kentucky. Many specimens of the highest art in flint are found in our state.

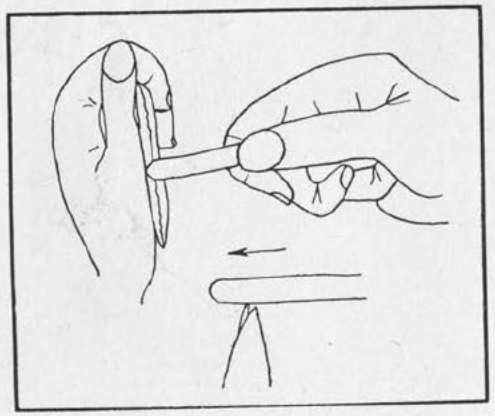


FIG. 109. CHIPPING FLINT.
Method of using the "bone-flaker."

Probably the simplest article of manufacture from the quarry blank was the flint knife. In fact, almost any flint chip was sharp enough to cut leather or even bone or horn. Many knives were placed in handles, as their outline shows. These were of the long slender variety. There were, however, many knives made from beautiful blanks 6 to 8 inches long and even longer, which were certainly used without handles, and must have been very efficient tools in the removing the skin from a deer or bear, but were certainly much too blunt to be an efficient weapon.

Fig. 110 shows a group of such knives, the form usually hafted.

Among the most beautiful flint artifacts are the so-called spear heads. These vary in length from 3.5 inches to as long as 10 inches or even longer. It is not certainly known that ancient man made use of spears in the true sense. Doubt has been expressed by some that early man in Kentucky ever used spears and by some these artifacts are thought to have been

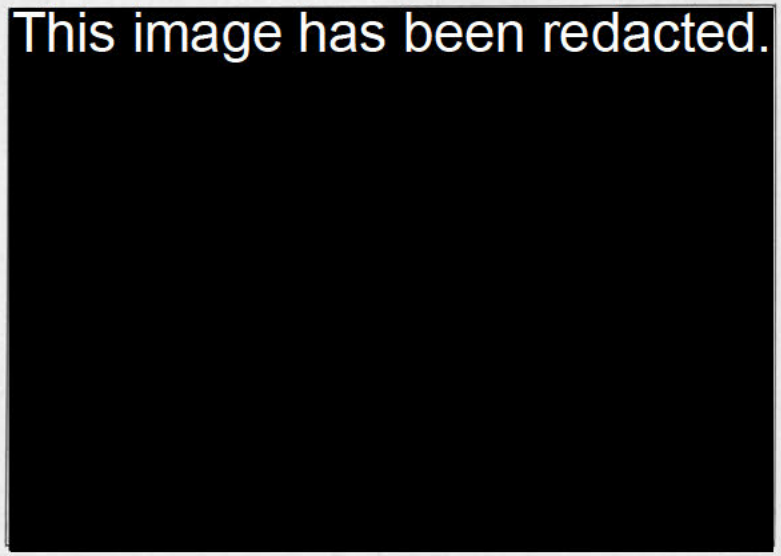


FIG. 110. FLINT KNIVES.
This form of knife is believed to have been used with a handle.

knives. In most cases they were notched for "hafting" and with a convenient handle would have been a very efficient weapon. By some, these "spear points" are thought to have been used largely as emblems of authority, carried on a long shaft, to be stuck up in the ground outside of the lodge, to indicate the rank of the occupant, and in time of battle to be carried as a standard about which the followers of a chieftain would rally.

In many instances, the "spearpoint" has exactly the distinctive characteristics of certain type of arrow point, found in the same locality. This fact would seem to indicate that they were expected to be used for similar purposes. It is well established that the historic tribes, especially the western tribes, not only used the spear as a symbol of authority, but used it as a ready weapon of offense and defense. Especially was this true of the historic Indians living on the plains, and accustomed to the use of the horse. The finding of so many spear points in good condition, many of them showing a very high order of ability in working flint would seem to argue that early man actually used these large flint blades as the points of true spears.

FIG. 111. SPEARPOINTS.
The one on the extreme left is 7¾ inches long. The arrows in the photograph show the same type of notching and are believed to represent the same design.

Figure 111 shows a number of these large spearpoints. A number of these have been shown for comparison by the side of an arrowpoint of the same form, and believed to have been used by the same people.

To the uninitiated an arrowpoint is an arrowpoint, but to one who is willing to study their form, and collect data as to their association and distribution it is a source of never ending delight to become aware that certain types are standardized as to manufacture and that their occurrence is limited to certain areas, and certain definite associations. After having inspected and compared thousands of arrow points from the State of Kentucky as to size, material and distribution, it seems reasonable to assume that every tribe had one or two, or at most only a few types, recognized by them as standard for a definite purpose. These forms would naturally occur in this tribe in vastly greater numbers than those which might be equally good, but which were the result of some individual design of some arrow maker

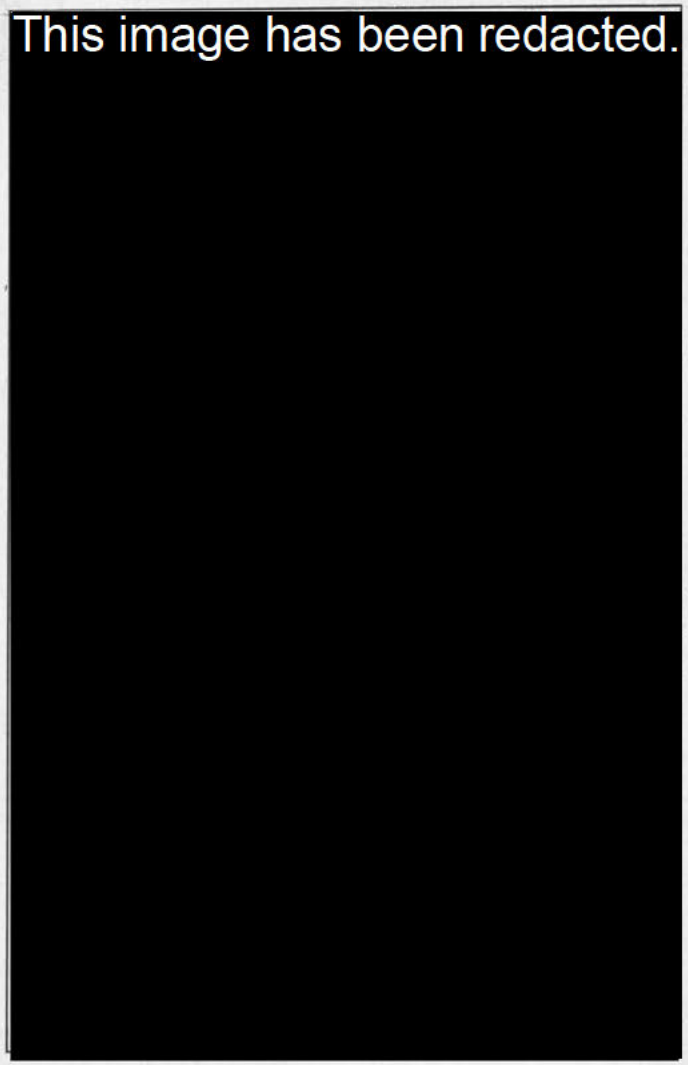


FIG. 112. ARROWPOINTS.
Representative types common to Kentucky.

or the peculiar desire or design of some individual hunter or warrior.

Certain it is that if one gathers a thousand arrows from any restricted area in Kentucky, such as a single county or group of

adjoining counties, and begins to sort out the arrow points that are alike in some distinct characteristic, he will be struck with two outstanding facts: First, that about 85% or more of all the points will fall easily into some 4, 5 or 6, or more groups, (see Figs. 112-113) with considerable varieties of the number in each group. And second, that the remaining 15% seem to defy classification. This 15% remnant often contains the most beautiful individual specimens, showing the highest degree of workmanship, and while probably no two are exactly alike, one form may by gradual graduation pass into another very different form by steps so small that it is difficult if not impossible to say to which form the intermediate specimens belong.

FIG. 113. ARROWPOINTS.
Large flat types showing excellent workmanship.

This experiment has been tried many times upon coming into possession of a large number of arrowpoints from a given area, and the conclusion is ventured that, for certain tribes, races, or cultures, there was one or perhaps at most a very few standardized forms, each perhaps for a definite purpose. Points of one of these standard forms, are exactly alike as to size, shape,

distinguishing characteristics, and generally as to material. In such investigations it is quite easy to observe that certain type forms have a wide distribution and form about the same per cent of the whole number, in one county as in another county, perhaps two hundred miles away, (see Fig. 114) while other distinctive type forms appearing as a large per cent of the whole in a restricted area will disappear or be a negligible percentage

FIG. 114. ARROWPOINTS.
A type which is quite rare but which has a wide distribution, being found scattered over all of central and western Kentucky.

in an adjoining county. It is believed that the plates of arrowpoints presented will demonstrate this point. If this be true, we have a basis, however an uncertain one, for distinguishing between those types of arrowpoints which seem standard over a large area, and must have found wide usage throughout an extensive Culture from those types which were perhaps tribal rather than cultural, and which found only local usage by a smaller group. We have another form characteristic of Hardin County, Kentucky, while it is believed that standardization was natural and was actually taking place, yet on the other hand it had not eliminated individual specialization as suggested.

It has been suggested by other writers on the subject that the apparent similarity in form of a large portion of the arrowpoints found in any one locality was to be attributed to the skill of perhaps an individual workman, or a group of workmen whose technique distinguishes the artifacts rather than a difference in tribal or racial ability. This idea has been expressed by Moorehead in his "Stone Age of North America" as follows:

"Little attention has been paid by archaeologists to ascertain an important feature of prehistoric times. I refer to the presence in most of the tribes of skilled workmen whose speciality seems to have been the manufacture of certain kinds of implements. That some men were more skillful in the making of axes or pipes, and handled bone chipping-tools with more dexterity than others, goes without saying. If one were asked to state what proportion of men were skillful in the art of stone-working, no one could give a definite answer; but the searcher finds in limited areas a particular style of flint-chipping, or a local form of axe or pipe. These appear to have been made in the same manner, perhaps with tools of the same pattern. The guiding hand of the master-workman is seen. Each one is stamped with individuality, therefore one may conclude that either a certain person made these objects, or perhaps the men of a given family made them.

"Supposing that a young man who showed proficiency in flint-chipping should at the age of twenty become so skillful that his works were in demand. It would follow that if he were given the ordinary span of life, his period of proficiency would extend for forty years. If he retained his health and faculties, his activity might reach fifty years. It is also quite likely that other men, perhaps not so competent as himself, assisted him in his work and blocked out the forms or reduced them to convenient size for him to finish. Such a labor division as Catlin and Sellers affirm existed, enabled the skillful worker in flint to produce a larger number of implements than if he attempted to work his own material from the initial stage to the completed form. His people residing in the same village would avail themselves of his wares, giving him in return food, or implements, or clothing. His surplus stock in all likelihood was sent to a distance to be exchanged with other tribes.

"Such a man may have selected flint of a certain color, so that the product of his labor might be instantly recognized."

Undoubtedly there were individuals in every tribe more skilled than their fellows, and certainly it is highly probable that they did leave their individual impress on the product of their flint shops, as the evidence offered by Moorehead and others proves, yet if all type forms are to be explained in this manner, the arrowpoint can have no story to tell of tribe or racial occupancy of a given area. Where the facts are known from historic times, or otherwise, however, it must be admitted that there are many instances of a type form of arrow being characteristic of a special tribe or culture. In proof of this witness the tri-

angular arrow with no stem found in New York State and taken from known rather recent Iroquois sites. Also witness the triangular arrow of Cherokee and pre-Cherokee territory—as revealed by Harrington's work on the Tennessee River.

In further proof of this idea that the type form at least may reveal a racial or cultural connection there is mentioned the very serrated triangular arrow of the Ft. Ancient Culture.

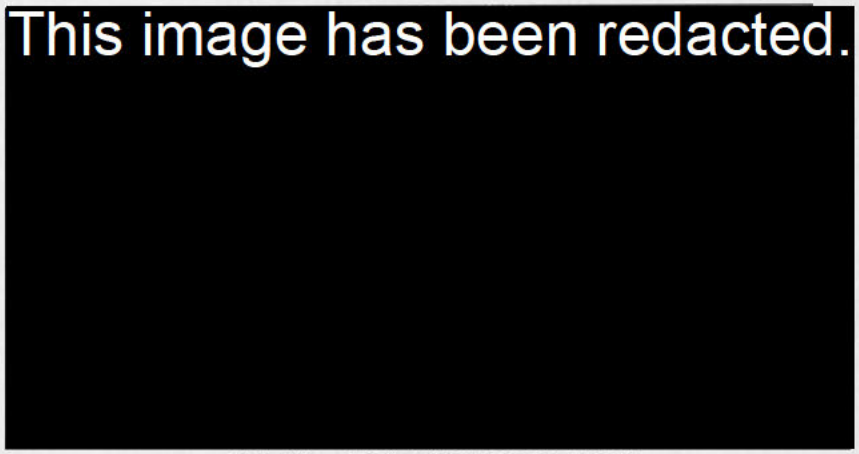


FIG. 115. SERRATED ARROWPOINTS.
Believed to be characteristic of the Fort Ancient Culture.

This is generally accepted as typical of this culture, not being found elsewhere, although it must be admitted that it was by no means the only form of point used by this culture.

Certain it is that many very beautiful forms of arrow points representing types commonly found in Kentucky have at present no known tribal or cultural significance. Whether archaeological investigation will ever be able to discover such relation, if indeed it ever existed, is a matter for future determination. In dealing with this subject it is of course impossible to figure in this report all of the important types found in Kentucky but a few are shown in the accompanying figures which we believe will illustrate the ideas advanced. To undertake to make a systematic study and classification of such artifacts would lead far beyond the scope of this work.

Among all the varied problems presented by the great variety of arrowpoints and their distribution perhaps no problem is more interesting than that suggested by the very small arrowpoints often found in graves, commonly called "bird arrows." What was their purpose? How were they used? Why

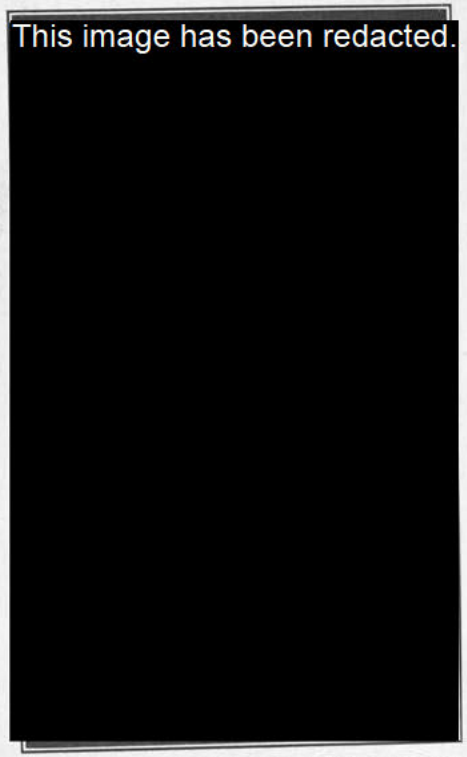


FIG. 116. THE SO-CALLED "BIRD ARROWS."
The spear-head shown for comparison is six inches long.

were they made? They seem to be found in exactly similar forms as the larger arrow points, and generally in association with graves. When found, they are in groups of six or eight or more, which seems to indicate they were part of a sheaf of arrows. It is difficult to understand their purpose—it appears that they were too small to be effective at any great distance. It has been suggested they were used to kill birds, hence the name, bird arrows. This seems hardly reasonable. Again the sug-

gestion has been made that they might have been used in a "blow gun." There seems, however, no actual evidence for this in either history, or archaeology beyond the finding of these small arrows. Figure 116 shows some of these small arrows for comparison with a spear six inches long. Note the similarity in form of the spear, and the point at the lower right hand corner.

FIG. 117. DRILLED ARTIFACTS.
The first and third specimens were drilled with a reed drill; between them is a "core." The last three specimens in the first row are "drill-heads" for holding the reed. The second and third specimen in the bottom row show conical drilling, and the fourth and fifth are the flint "reamers" used for such drilling.

A very important implement of primitive man was his drill. Certainly he used it to produce fire, as is well known from historic records, but in addition it served the purpose of boring holes in all of the various type of artifacts which required such drilling.

Two quite distinct types of drills were apparently used and for purposes of description these may be termed the "reed drills" and the "flint drills," the former being used to bore a hole which was uniform in diameter and the latter to ream out one which was conical.

The reed drill consisted of a shaft of reed or cane, held in place by a drill-head or hand-hold and was rotated alternately one way and then the other by a bow, or alternately wound

thongs, or other such device. If a solid shaft was used, a cylindrical hole was ground into the stone which was drilled, the hole having straight sides, the same bore all the way down and the bottom smooth and oval unless the hole was cut entirely through the specimen. If, however, the shaft was a section of cane, it would cut a cylindrical hole, with straight sides, but would leave

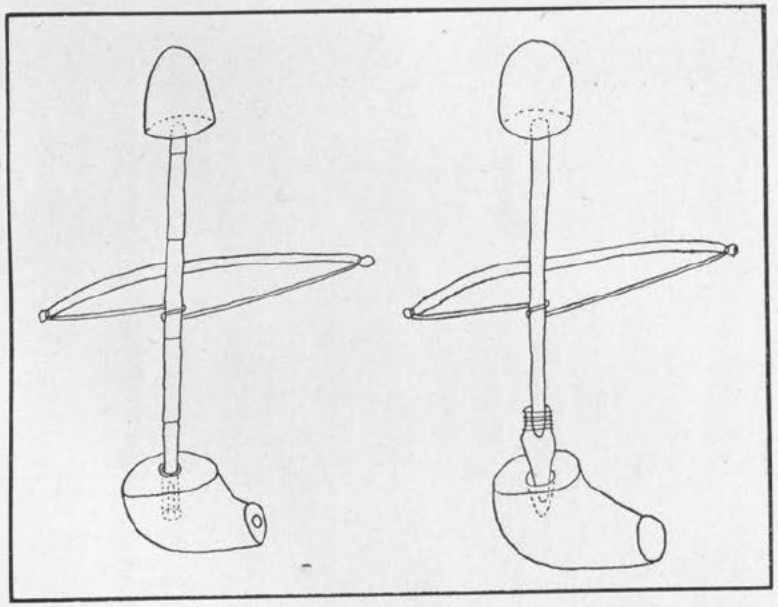


FIG. 118. METHODS OF USING DRILLS.
The "reed drill" is shown on the left and the "flint drill" on the right.

in the center of the hole an undrilled portion or "core." Many artifacts left incomplete show this core and prove that the drill was a cane stalk or equivalent form. At least one such core cut completely out has been found by the authors.

The other type of drill with which we have more particularly to do in this chapter is the flint drill. This was perhaps quite similar to the reed drill, except that the point of the drill was made of flint, specially formed for this purpose. In general, no matter how carefully this flint point was worked, it was necessary that the base of this point should be larger and stronger. The hole made by such drill points was conical rather than cylin-

drical. Occasionally the sides of such holes had so great a slope that the points which made them were really reamers rather than drills.

Figure 118 illustrates these forms of drilling and figure 119 shows a collection of drills of similar form but differing in size. This form is typical of Ft. Ancient Culture.

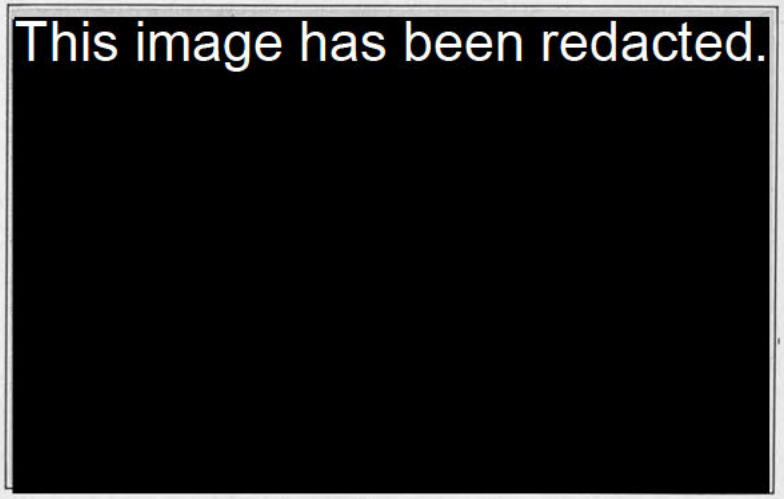


FIG. 119. FLINT DRILLS.
This type of drill is believed to be characteristic of the Fort Ancient Culture.

In general the drill points show a form having an enlarged base for attachment to the shaft, and a long slender point. Some specimens show the result of use, the point having been broken off, and the drill reworked to a new point. Occasionally the base of the drill is notched to facilitate attachment, as shown in figure 120.

The height of the art of flaking flint is probably shown in the manufacture of flint hooks and harpoons. Figure 121 shows a number of unusual forms. The hook may have been used as metal hooks are now used to "gig" fish under the ice or in the muddy bottoms of streams. True fish hooks made of flint are not uncommon in Kentucky. The harpoons show a single or double barb and were apparently very insecurely attached to the shaft in the expectation that they would leave the shaft but carry the cord attached, and hold the fish by the barb.

FIG. 120. NOTCHED DRILLS.
Showing bases enlarged for the attachment of a shaft.

The cutting and tanning of animal skins occupied a large place in the life of primitive man. In this process he not only used flint knives, but made another very convenient tool, the so-called "celt." The celt was sometimes chipped from a fairly

FIG. 121. CURIOUS SHAPES.
Hooks, harpoons, scrapers and scalers made of flint.

large and rather thick section of flint and was used much as the smaller knives are used. In the process of tanning skins, much scraping was necessary to remove surplus tissue, and to soften the skin in the curing process. In this work the celt played a large part. The edge was sharp enough to cut leather if desired, and yet dull enough to make a good scraper.

When flint celts were first made, they were chipped or flaked out roughly, but after long use they became smooth, developing an edge as sharp as is produced by grinding. Figure 122 shows a new celt chipped out, but little used. The other specimens show long usage, and a very high polish. Similar implements were made by grinding and polishing stone, some of which were attached to handles, and used as hand axes. It is not believed that flint celts were hafted. They were never notched nor grooved and show no evidence of being hafted.

FIG. 122. FLINT CELTS.
Showing newly made specimens and those highly polished by use. The specimen in the lower right-hand corner is coated with hematite.

Besides the celt which was a form of scraper, there were several other smaller forms used for the same purpose. It seems that many arrows when broken at the point, were reworked to a very blunt edge, and used as scrapers. Being small they were probably used attached to the arrow shaft. Scrapers of a size

comparable to arrowpoints were made from original flint flakes. These scrapers were generally pear shaped or oval in form, and quite sharp on one side of the large end.

Figure 123 shows a group of these scrapers, and for comparison a group made from arrow points. These have been

FIG. 123. FLINT SCRAPERS.
Some have evidently been made from arrowpoints and some are believed to have been used to scale fish.

designated by some as "fish scalers" and seem to be most plentiful in village sites near rivers.

Besides these scrapers, many others of larger size and varied form were made from flint flakes. When a flint concretion was broken, the conchoidal fracture gave considerable curvature to the flakes; these were often used to manufacture scrapers, as they were sharp and required but little additional work. Many still retained their original curved surface. The forms of these scrapers are so varied that it is difficult to understand how some of them could have been used. The long, finger-like flint flakes show very careful and accurate chipping, but it is clear that they must have been used in a very different way from the broad sharp blades.

Of all the artifacts left by primitive man, perhaps the hoe speaks most eloquently of village life—a continued occupancy

of one place—and indicates the beginning of agriculture. This step in man's development marked a very important stage. By this means man began to till the soil, and obtain food from the earth by labor, rather than by fishing and hunting. It is to be supposed that he would have developed the art of chipping stone to a high degree before he came to have need for hoes. This seems to be the case, as the flint hoe specially shows a high order of workmanship. Stone hoes were made of both flint and limestone, and used extensively in certain areas of Kentucky.

FIG. 124. FLINT HOES.
The notched form found in Western Kentucky.

Flint hoes are quite common in the fields of Western Kentucky, beyond the Tennessee and Cumberland Rivers, and extend into Tennessee, as well as on the other side of the Mississippi River in Missouri and Arkansas. These hoes are generally of three forms, one notched and two unnotched forms. Figure 124 shows several notched hoes from the author's collection. These are generally broader at the cutting edge than at the notch, and were of course attached to a handle more or less crude. Well made hoes of this type show that they were first made by removal of large flint flakes from a large concretion, and then sharpened by fine chipping. As they were used, they took on a very high

polish. In some specimens this polish occurs not only at the edge but spreads over the whole surface.

Of the unnotched varieties there seem to be two different forms. One of these is broad at the edge, the base coming to a point, and while no notch was made, it shows evidence of attachment to a handle. These hoes vary in size from 4 to 10 inches in length. The other type is a general oval in form, the cutting edge being not nearly as broad as the central portion of the hoe. They are much longer than the other forms, and have

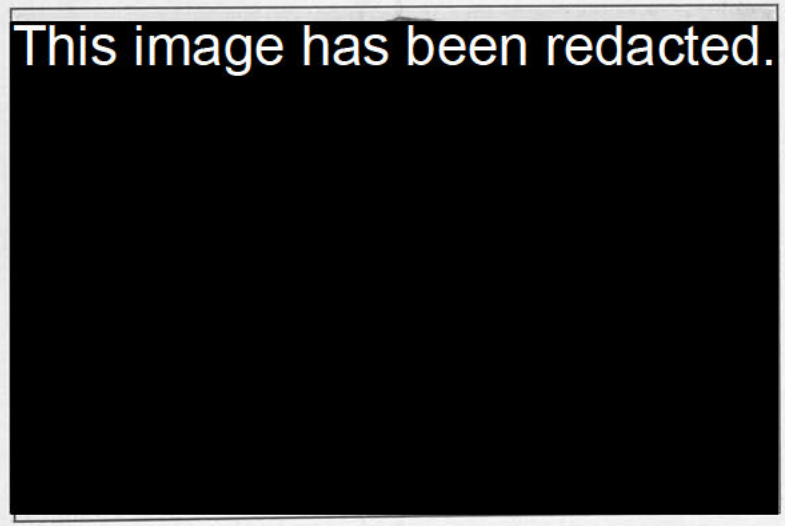


FIG. 125. FLINT HOES.
Of the unnotched type but well made and highly polished.

been reported as long as 19 inches. They rarely exceed 4½ inches in breadth. It has been suggested that some of these specimens show evidence that they were attached to handles which prolonged their length, and were therefore not used as hoes, but rather as spades. This may be correct, and may account for their rather great length, which in such case would be a help in attaching a handle but which if used as a hoe, would probably make the instrument rather cumbersome.

Along the Cumberland River in Southern Kentucky is to be found another type of hoe made by percussion. This hoe is

made of limestone, and is quite crude. The material did not permit flaking like flint, and was therefore hammered from a slab of stone of proper size. Such hoes are never found in the fields, as are the flint specimens of Western Kentucky, for the reason that being of limestone, they weather rapidly, so that in a relatively short time all of the surface polish, and much of their distinguishing form is lost, and if ever seen again they appear in no way different from any other rock in the field.

FIG. 126. LIMESTONE HOES.
Some may have had straight handles and have been used as spades.

Primitive man had to go to enough trouble, however, in the manufacture of such hoes to cause him to value them. Where he lived in caves and cliff dwellings, he carried them to his dwelling and many have been found in cracks and fissures in the walls of cliffs and caves, and on shelves of rock, just where they were laid away by their original owners.

In the Hines Cave, at Mill Springs, Wayne County, investigated by the authors, some 40 limestone hoes were discovered in the general digging in the floor of this cavern. While they were generally crude, some of these hoes showed high polish,

the condition of the cavern being such that the limestone suffered no weathering within it. With primitive man, labor such as the use of a hoe involved, was considered degrading, and was therefore left for women to perform. The hoe was therefore the tool of women, and was not held in high esteem. This may account for the fact that while flint hoes are often ploughed up in the fields of Western Kentucky, and the caves of Southern Kentucky

FIG. 127. HAMMERSTONES.
Smoothed by constant handling and indented by long use.

yield many limestone hoes, such artifacts are not generally found in mounds, and cemeteries.

Of all the many hoes found in this state, so far as the authors are aware, only one record exists of hoes being found in connection with graves. This record is from Mr. I. R. Williams, of Union Town, who reports that in opening an Indian grave in that vicinity three large flint hoes were found stuck up on edge about the head of the skeleton. Certainly this was a most unusual situation, and causes one to desire a reasonable explanation. Perhaps this individual was during lifetime a

master of flint chipping, and a maker of hoes. These specimens may have been placed in his grave as a sign of his occupation, rather than as prized possessions suitable for honoring the dead. Certain it is that hoes were not generally regarded as a proper offering for the dead, and are practically never found in association with graves.

In the process of flaking bowlders by percussion, not only was the bowlder worked by the process of hammering, but the stone used as a hammer showed the result of such usage. The first hammerstones used by primitive man were certainly no more than bowlders or broken pieces of rock of convenient size and form. However, as he began to specialize the use of the hammer for various purposes, it became necessary for him actually to manufacture, by rough pecking, hammerstones of convenient form. In general they appear in two types. Those used in direct percussion, and those used in indirect percussion, by hammering a chisel, or bone flaker. Those used in direct percussion are battered by use and generally are worn down to a disk form, the edge being the battered portion. When indirect percussion was used the chisel or flaker by use wore down the central area of the hammer faster than the edge and thus the hammer became pitted. Sometimes these pits were quite deep and often occurred on many sides of the stone. This modification of form actually was a type of slow grinding, the the result of flaking by percussion. Figure 127 shows a number of these forms of hammers produced not by intention, but incident to actual use.

Another type of stone artifacts, made by chipping, is the stone disk. The use to which such disks were placed is problematical. They have generally been regarded as possible game stones. The material may be any stone common to the locality. Figure 128 shows a number of these chipped disks from the Clay Mound. These vary in size from 2 to 5 inches in diameter. They are quite crude, and were left rough, no attempt being discernible to polish them. They were found scattered through the body of the mound in the general digging, but were not so far as observed in association with burials. The authors while investigating the mound on the Singer farm in Scott County, discovered on the top of this mound, which had been practically

destroyed by cultivation, a number of these disks. They were all of limestone, about 3 inches in diameter, and while quite similar in size and form, were very crude.

Similarly shaped disks were found in the Fullerton site, these being chipped from flat river pebbles. It has been suggested that these disks were used in playing a game, similar to

FIG. 128. STONE DISKS.
From the Clay Mound in Nicholas County. These may have been used as "game-stones."

the game played with the highly polished discoidals, but it may be that they were only hammerstones. While their use is unknown, we may at least be reasonably sure that they are always found in quantity, when found at all. They are found only in mounds on or near proven village sites, and never in direct association with burials.

In concluding the discussion on chipped implements of primitive man in Kentucky, it must be accepted that the chipping of stone, like every other acquired art, shows a very marked development from the earlier and very crude implements to the

later and more highly wrought objects. As a man developed in his ability to handle stone by this process, the variety of objects made by him increased, and the more highly specialized forms made their appearance. As he developed skill in his technique in handling flint, he necessarily studied the texture of other stones and their properties of cleavage, and thus developed, perhaps unconsciously, considerable skill as a lapidary. The knowledge of stone properties allowed him to select his material to the best advantage. This knowledge as well as great skill seems to have been necessary to account for the great variety and beauty of chipped stone artifacts found in Kentucky.

CHAPTER XII

GROUND STONE ARTIFACTS

Primitive man produced for his use as tools or ornaments a great variety of stone artifacts usually designated by the term "ground implements" in which, as the name implies, the process of grinding was used in their manufacture. While in most cases this was all that was necessary to produce the desired form, yet in many cases before grinding could be begun, the stone must be chipped into the approximate shape, this step being very important in determining the final size and shape of the implement. Grinding and polishing took place after the approximate shape or form was wrought out, although in some cases much of the final polish may have come by actual use of the implement if we may judge by the fact that the portion having most use obtained the highest polish. This hammering into rough form is usually called "pecking" to accomplish which a special form

FIG. 129. THE FIRST STEP IN GRINDING.
Artifacts roughly "pecked out" ready to be polished. The specimen in the upper left-hand corner is a double-bitted ax.

of hammerstone was often used. Such hammerstones were of very hard material and were somewhat egghsaped with one rather sharp end which was used to do the pecking. Figure 129 shows a granite pebble rough-pecked into a form suitable for the manufacture of an axe or celt. It will be noted that much of the original water-worn surface of the pebble still remains, the pecking showing only on the edges. In this figure is shown also a typical pecking hammerstone showing considerable use and a portion of a roughed-out pestle. This pestle, made from a block of stone almost square in cross-section, was being converted into a rough cylinder at one end when it broke in the process and was discarded. The original square end was left to be the grinding end of the pestle but shows no signs of actual use; it was, therefore, never part of a finished object.

Such findings would seem to indicate that primitive man, in working stone, brought the implements by rough pecking to practically the final form before beginning to grind or polish them. We know but little of his method of grinding, which must have been crude at best. Doubtless he learned the use of sand, sandstone, and water, but even under the most favorable conditions the process must have been laborious and very slow. His artifacts therefore testify to patient effort and great industry in their manufacture.

For the purpose of our discussion, we may classify the ground implements found in Kentucky, including all those rough-pecked, polished, and drilled, as follows:

a. Axes
b. Celts
c. Chisels
d. Pestles
e. Mortars
f. War clubs
g. Play balls
h. Pipes
i. Discoidals
j. Plummets
k. Net sinkers
l. Cones
m. Banner-stones
n. Gorgets
o. Pendants
p. Drill heads
q. Whet-stones

The most important implement made by pecking and grinding was the stone ax. In discussing the various forms of axes one is forced to include the celt, as many celts, both large and small, were attached to handles and used as axes or hatchets. For the

purpose of this discussion axes will be divided into four classes as follows:

1. Groove extending completely around ax
2. Groove on three sides—one edge flat or concave
3. Double-bladed—center groove
4. Celt-like form, ungrooved

The full-grooved ax appears in Kentucky as elsewhere in the United States in a great variety of forms and sizes. Some are not more than two inches in length and weigh only four or five ounces while others are quite large. Recently a stone ax was reported as having been found near Ashland which weighed thirty pounds. Figure 130 shows a number of forms of the full-grooved ax. Generally this type of ax has a rather flat poll, and

FIG. 130. FULL-GROOVED AXES.
Various types of axes in which the groove extends entirely around the stone.

the bit or blade is usually much smaller in width than the body of the ax. These general characters are well illustrated by the central specimen in Figure 130 which shows also that in the manufacture of grooved axes, even the groove was rough pecked, before polishing. In as much as the groove could have been only

for attachment, it was probably left unpolished in most cases, and such polish as it acquired was due to actual use. The full-grooved ax was attached to a handle by lashing to the side of a straight limb of some pliable wood. Several have been found with handles still attached. In particular one such hafted ax was found on a shelf of stone in Hines Cave, Wayne County, Kentucky.

FIG. 131. PARTLY GROOVED AXES.
Grooved on three sides with one side flat or convex.

Specimens of the ax grooved on three sides are shown in figure 131. In general this is a larger type of ax than the full grooved form. There appear to be a very few small specimens that are not full grooved. It is generally assumed that the flat edge, left ungrooved, was placed next to the end of the handle. After the ax had been lashed to the end of the handle, rather than to the side, a wedge was inserted between the end of the handle and the flat side of the ax, and upon being driven in, the lashings were drawn tight. While there are many very highly worked full grooved axes, there appear to be also many quite

crude. This cannot be said of the flat edge ax. Practically every specimen seen by the authors is a highly finished tool.

The double bitted ax is quite rare in Kentucky. The one shown in figure 129 is typical of this form. In general they are crude, the edges rather blunt and poorly worked. Some specimens of this type while they have a central groove are so poorly finished they could have been but litle more than clubs when hafted.

In general the ax was a utility implement and is seldom found in mounds or in association with graves. Stone axes are usually found singly in fields, generally as the result of cultivation, and are not necessarily to be expected on village sites in greater number than in the open country. It is generally considered that the grooved ax was wholly made for service, and had no ceremonial significance. Therefore it was not an object of particular veneration or respect. The right-hand specimen

FIG. 132. CURIOUS AXES.
One with a hemitite coating, one of copper, and one of banded slate, as figured from left to right.

in figure 132 shows an ax with full groove, made from banded slate. This specimen was found on Johnson Creek near Piqua in Robertson County. Being of banded slate it is much too soft to serve any useful purpose as an ax. Its being well made and highly polished suggests that here is an ax made for some ceremonial purpose since it is quite unusual material for an ax.

Another full grooved ax of especial interest is shown in figure 132. This ax was made originally from a mass of iron-

carbonate. It was worked down to the desired form, having a full groove and sharp bit. When discovered in the field it was covered by a coating of limonite, 3.5 mm. thick. This coating is the same thickness in the groove as over the rest of the specimen. The whole of this coating must therefore have been formed after the ax was finished. If this coating was produced by weathering of the carbonate the very interesting question is raised as to how long it would take a specimen of this kind to develop a coating 3.5 mm. thick. Clearly the great thickness of this coat might argue a very great age.

In the consideration of axes it is necessary to include stone celts, as in many cases they were hafted, and used as hand hatchets and axes. The celt which is ungrooved has quite as great a range of variation in form and material as the grooved ax. Many celts are but one inch broad by 1½ inches long, the largest shown in figure 133 is 9¾ inches long and weighs 5½

FIG. 133. CELTS.
Various types of stone celts from Kentucky.

FIG. 134. STONE CELTS.
A variety of highly polished celts.

pounds. Celts were rough pecked into shape, and then polished. Being made of granite and other hard stones, they often took on an exceptionally high polish. Celts have been classified generally as to form. The outstanding types are (1) oval form, (2) flat on one side, pole pointed, (3) straight sides, pole flat, (4) flared bit, pole rounded. Figures 133 and 134 show specimens of each of these types. Many stone celts, like the flint celts already mentioned were doubtless used as scrapers, for dressing skins,

but many apparently were hafted. One very interesting type of very small celt is the form made of hematite. These are usually quite small, from 1¼ to 2 inches long and 1 to 1½ inches broad. They are highly polished and have quite sharp edges.

The pole of these small celts is also quite smooth, and the body is quite thin. It is commonly supposed that they were set in a large piece of wood, used as a war club. Such a club studded

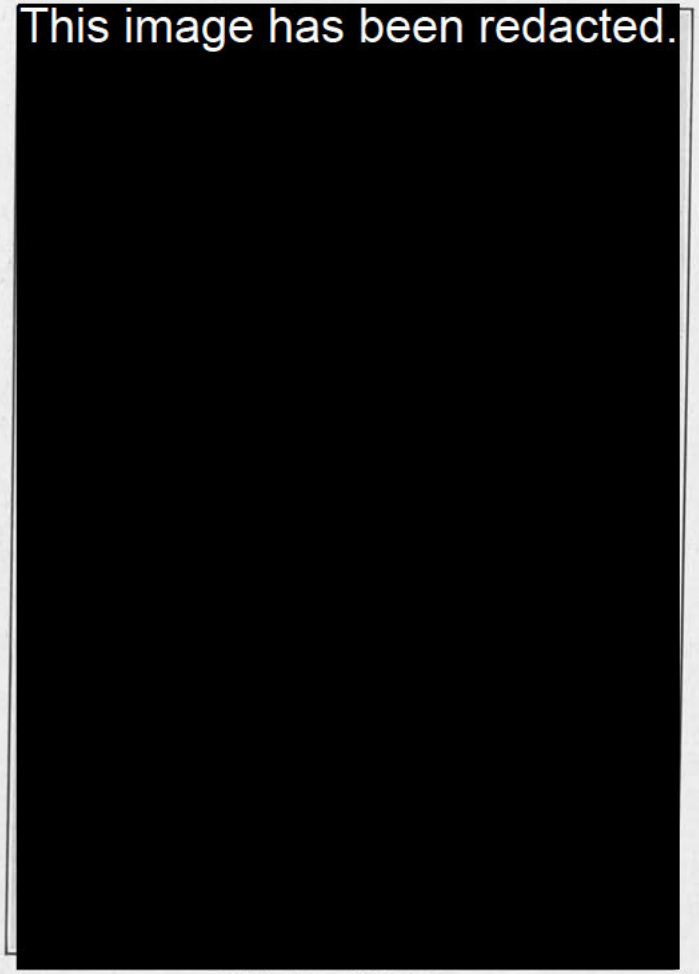


FIG. 135. CHISELS.
In the lower row are shown two of the peculiar "double-bitted" type.

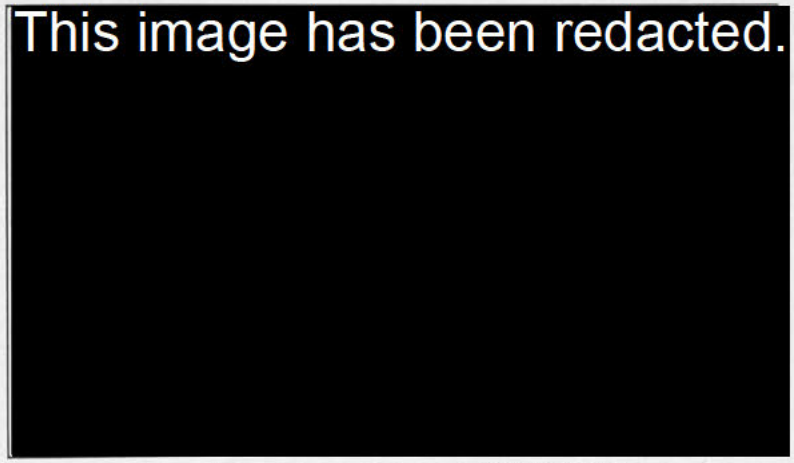


FIG. 136. WAR CLUBS AND PLAY BALLS.
The war clubs in the upper row are grooved for attachment; the play-balls in the lower row are spherical and highly polished for rolling.

with these small celts would be a very effective weapon. This supposition is based on the known practice of historic tribes to insert pointed objects in their war clubs, holding them in place by the use of asphaltum, and also from the fact that these small hematite celts are often found in graves in groups of 3 or 4 or more together.

Closely related to the stone celt, is the chisel. These artifacts show great care in manufacture, being made of granite, greenstone, and even of limestone. Many show the effect of being buffeted with a hammerstone, the basal end being chipped. Chisels are often found in graves and seem to have been highly regarded as mortuary offerings. The longest specimen in figure 135 is 8¾ inches long, of limestone, and was taken from the left hand of an extended skeleton in Fox Field by the authors. The same figure also shows a number of beautiful chisels which are double bitted. It is difficult to understand how such chisels could have been used unless they were hafted. The blades show no damage by use as would naturally be expected if they had been struck with hammerstones. It has been suggested that many of the more highly finished chisels were not utility implements but rather were ceremonial. These chisels certainly could have been

used in splitting and working wood. It is well known that they were used in the soapstone quarries to cut out blocks of soapstone from which stone vessels were made.

From the blunt form of grooved ax, it is a very simple transition to the so-called war clubs. These are of cylindrical, or spherical form, of heavy stones, rough pecked into form, and having a groove about the center. Like the axes, they are ploughed up in the fields, and occasionally found in village sites, but never with burials. It is supposed that the club was made by passing a thong about the groove, the thong wrapped on itself forming a pliable handle. Many very true stone balls, of a size quite similar to the so-called war clubs are commonly found on village sites. These balls have no groove and usually are formed by rough pecking, but rarely is one found polished. Two explanations have been offered for their manufacture. One idea is that they were sewed in a section of buck-skin to form a club, and carried and used similarly to the grooved club. Some writers affirm that they are "play balls" used by Indians even up to historic times to play a game similar to the game of "chunkee" played by the Choctaws with disks and crooked sticks.

Next to the ax in importance as an implement made by rough pecking is the stone pestle. They appear in five distinct types in Kentucky, though two of them are by far the most numerous. These types might be described as:

1. Bell-shaped pestles, base flat
2. Bell-shaped pestles, round oval base
3. Bell-shaped pestles, pointed base
4. Cylindrical
5. Ellipsoidal bowlder

These different forms are shown in figure 137. Each was evidently designed to serve as a pestle, but in a very different way. The bell shaped pestle, with the flat base, was used to grind grain, and parched corn, on any flat surface. They are usually well made and are polished by long use. They appear in both circular and square base forms, and all have well constructed handles. This is not an accident, but a necessity. Where the grinding was done by hand, the handle was a necessity and well made.

Reference has been made elsewhere to the "hominy holes" of the cliff dwellers. The pestles used in connection with these hominy holes were also bell shaped, but were used in a very different way. These holes were conical in form, and are often three feet deep, or more. They usually are about nine inches in diameter at the top. It is believed that they were started in the rock ledge under the cliff by grinding out a hole only a few inches deep. By using one of the bell shaped pestles found in association with them, with the small end down, the operation

FIG. 137. PESTLES.
Left-hand specimen with flat base for grinding on a flat surface; right-hand specimen used in a "hominy-hole;" upper central specimen cylindrical for rolling; lower central specimen a river pebble fashioned to work in a groove.

of grinding corn could be made very simple. It required only that the pestle be raised and dropped into the hole, pointed end down. At least one hominy hole with pestle remaining in it has been found by the authors in Hart County which gave a clew as to the use of this type of pestle for grinding.

As the grinding of grain continued year after year the hole got somewhat larger and very much deeper, so that the pestle passed completely into the hole. Then it was lashed to a billet of wood, perhaps several feet long and the operation could be continued till the hole became so deep it was difficult to withdraw the meal from it. When this occurred a second and even

a third hole was started in the vicinity, often in the same large bowlder or cliff ledge in many cases only a few feet from the old hole. Thus hominy holes are often found in groups. The group contains the "worn out holes" too large for further use, the holes still in use when the site was abandoned, and often a small hole just started. In particular, the large boulder with the "hominy hole" found under the cliff in Hart County and removed to the University of Kentucky has been drilled completely through and when found had the bottom of the hole plugged with a broken pestle. The right-hand specimen shown in figure 137 was found under the Cow Cliff, 12 miles from Howe's Valley, Hardin County, at a depth of five feet in the accumulation of earth about a large sandstone bowlder which has in it three hominy holes, two large ones and a small one just started.

In another such bowlder under a cliff dwelling in Hardin county, the boulder contained three hominy holes, but in addition thereto some eight or ten well defined grooves, some nearly two inches wide and about an inch deep extended from the edge of the same surface of the bowlder, almost vertically downward along its sides some three or four feet. This particular bowlder was some eight feet higher than the present level of the cliff floor, and had on one side a large stone mass some four feet thick lying against it. The adjacent rock enabled one to gain the top of this bowlder with but little difficulty. It is probable that the original floor level of this cliff when inhabited by the makers of these hominy holes was much lower than at present. Investigation seemed to show that it was at least four feet deeper if not more.

An attempt was made to discover if possible what these vertical grooves in the side of this boulder could mean. The suggestion which seems most plausible was made by Prof. A. M. Miller, who with the authors investigated this cliff dwelling. It would seem that here the pestle working in these extra large hominy holes had been attached to a billet of wood in the usual fashion. The suggestion is that this pestle and attachment, instead of being raised and lowered by some one on the top of this large stone, was raised and lowered by a young sapling being bent over it from the cliff side above. The motion of the sapling and its attached weight being controlled by a person at

the base of the bowlder on the floor level, through a rope or wild grape vine attached to the sapling. Such a rope, by long usage, hanging over the edge of the large bowlder would certainly be able to cut grooves in the stone similar to those described.

While this explanation may appear as fanciful to some, yet the size of these hominy holes, being the largest seen by the

FIG. 138. LAP STONES.
Showing the deep indentations made by long use. From Marshall County.

authors, seems to argue that here was an ancient mill of more than ordinary capacity for grinding, probably serving the whole community living under the cliff. Whether the explanation is correct or not, the grooves testify to long wear by some object sliding up over the rounded dome of this bowlder, perhaps ten feet above the original floor level of this cliff and on that side of the bowlder where access to its side is most difficult, and where the footing is most uncertain.

Cylindrical pestles are found sparingly in Kentucky, and were used as simple rollers to grind grain on smooth flat stones called lap stones, from the known custom among historic tribes for the women to hold such stones in the lap when grinding. Figure 138 shows such a pestle and lap stone.

Specialized pestles made from small river worn bowlders, are also sparingly found in this state. Figure 137 shows a red granite bowlder, rough pecked, over half of its surface, to form a handle. The remaining portion is the grinding surface. Such pestles were usually used in grooved stones, worn into a trough some two feet or more long, the grinding being accomplished by sliding the stone back and forth in the groove.

The small bell shaped pestle, having circular base and convex basal surface, is quite common in Kentucky, being usually associated with a simple form of lap stone with which it is used. These occur over the whole state in small numbers, generally, but are very common in the western portion in the Cumberland and Tennessee River region, and westward. These pestles, rough pecked, and just large enough to give a grip to the hand, are found in large numbers on known village sites. The lap stone used with it is generally a large flat river pebble, though sometimes a square block of sandstone is used.

The lap stone required no process of manufacture beyond actual use. The woman of the tribe selected the stone, and with pestle began grinding. In time the stone became worn down till it could tell its own story. In this grinding the motion of the hand holding the pestle was a circle of only a few inches radius. The pestle being small, there was thus worn in the lap stone a circular depression from one to three inches deep, and from four to seven inches at its widest point. This method of grinding was an individual or family affair, and doubtless every Indian woman had her own pestle and lap stone, to judge by the number found in village sites.

In Marshall County, on the bank of Jonathan Creek, at its entrance into the Tennessee River, the authors with the Hon. W. J. Curtis and accompanied by Mr. Homer Sirls as guide, investigated the ancient village site at that place. The ground was cultivated in corn and covered with grass and weeds. Into this tangle of vegetation which almost precluded investigation of the surface, the party passed back and forth down the corn rows. They were rewarded by finding four beautiful specimens of lap stones in perfect condition. Several others were discovered broken, which were not removed. Figure 138 shows these stones,

with their pestles, together with one presented by Mr. Robert A. Shepherd, found by him on this same site.

Some of these lap stones were used on both sides for grinding, the amount of wear being about the same. Other specimens have in the reverse side one, two, or even three pits, about an inch in diameter and an inch deep. It is suggested that these pits may have been formed when the lap stone was used to hold a nut while being cracked.

FIG. 139. NET SINKERS AND CONES.
Highly polished artifacts usually with grooves for attachment.

The stone artifacts previously discussed in this chapter were generally but little polished in manufacturing except by actual use. To this group might be added "net sinkers" and "cones" shown in figure 139. The so-called net sinkers made of granite, hematite, dense phosphate and other heavy materials are usually flat on one side being in general semi-ellipsoidal in form. Many have a well cut groove over the curved surface, as if they were to be attached by a string to some object against the flat side. A suggestion as to possible use in connection with drills has been previously made. The use to which the so-called

"cones" were put is very uncertain. They have been called polishing stones from the idea that they were used to polish other implements. Many are made of hematite, or from carbonate of iron, which has a hematite shell over it. Granite cones are fairly common, and of high polish.

Of all the ground and polished implements made and used by primitive man, perhaps the most highly prized and carefully preserved was his pipe. This is not difficult to appreciate, when we understand that for him smoking was not a habit to be indulged at pleasure, as in our day, but was a custom, practiced only at certain times and for a specific purpose. By primitive man, smoking had a religious as well as a ceremonial and social significance. He smoked when he sat in council with his tribe. He concluded peace and confirmed treaties by smoking, and declared war or took other important steps only after the ceremony of smoking. Friendships were sealed by the persons smoking together, and writers of the historic Indian assert that he smoked for purposes of divination and to cure disease.

It is therefore easy to understand that, for a custom so full of meaning and deep significance for him, primitive man would expend his greatest effort and best skill in the manufacturing of his pipe. Except for such religious or ceremonial occasions the pipe was not used. The custom of smoking as an individual pleasure grew up in the 16th Century among white men both on this continent and in Europe after tobacco and the custom of smoking had been introduced into Europe. Even then the Indian of early historic time did not to any considerable extent adopt the white man's custom of indiscriminate smoking for pleasure.

After contact with white men, who learned to smoke, and made "trade" pipes, which were sold to the Indian, individual smoking became general. Certain it is that for prehistoric man, his pipe was an object of great veneration, because of its association, and because of its supposed power as a great medicine maker. It was natural that in selecting objects of veneration to be buried with the dead, the pipe would not be neglected. McGuire in attempting to fix the boundaries for the occurrence of certain large distinct forms of pipes, places Kentucky within

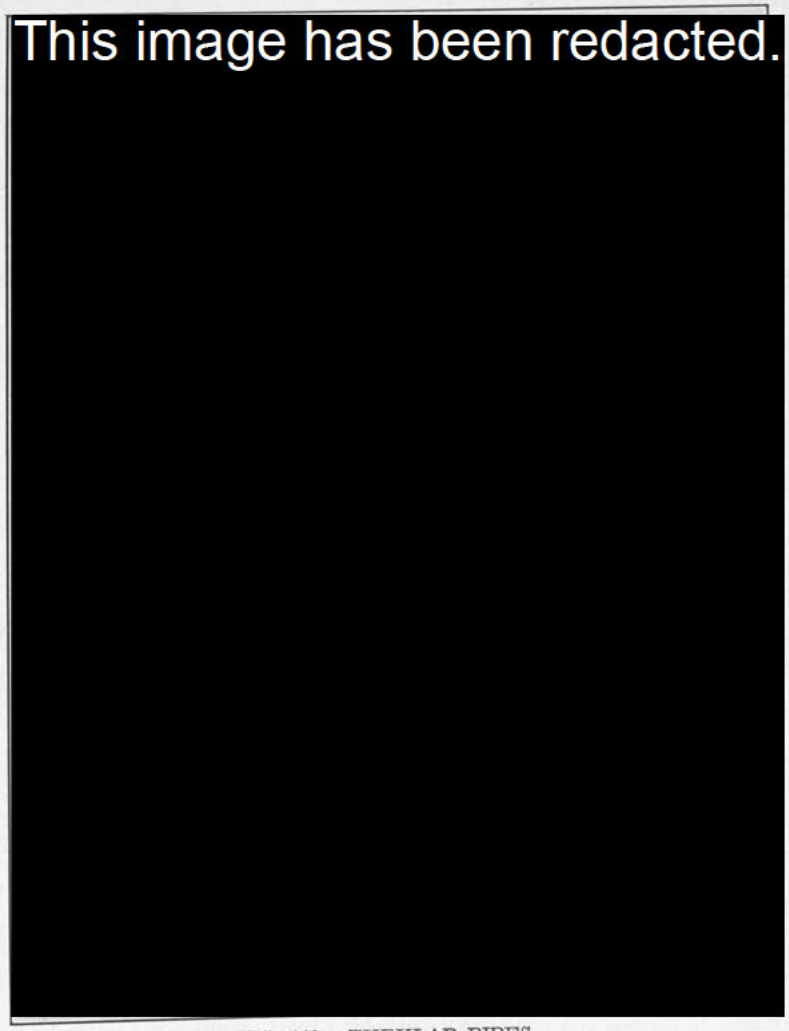


FIG. 140. TUBULAR PIPES.
The middle specimen in the upper row is engraved with pictorial writing.

the area of distribution of many forms. It is therefore to be expected that a variety of pipe forms should be found within the state. McGuire, Moorehead, West, and other writers on aboriginal pipes prefer to classify pipes as to their form and material, rather than assign to them tribal or cultural classifications. The

reason is one of necessity except in relatively few cases, the racial or cultural association of the pipe being unknown.

In the discussion presented in this chapter pipes will be discussed under the following groups. It is not pretended that this is a complete classification, but it is believed that it covers the forms most numerous in Kentucky.

a. Tubular
b. Heavy animal and bird
c. Monitor
d. Micmac
e. Disk
f. Double conoidal
g. Ovoid
h. Vase shaped
i. Elbow pipe
j. Totem
k. Siouxian

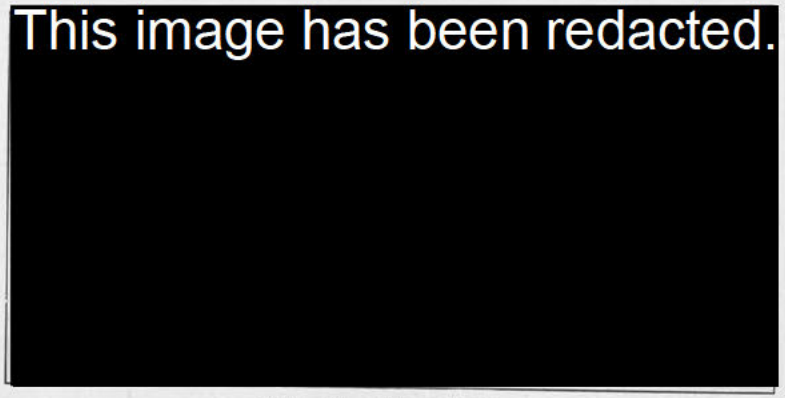


FIG. 141. BIRD PIPE.
A fine specimen of a zoomorphic form.

The tubular pipe appears to be one of the oldest forms. It occurs east of the Mississippi, through Ohio and Kentucky, southward and westward to the Pacific Coast. It is thought that it is the most primitive and its form probably developed naturally from the known custom of the tribes in the Southwest and Mexico, who when first seen by white men, used for smoking a roll of leaves, rolled out and twisted together to form a cylinder many inches long.

Tubular pipes usually have a large capacity in the bowl, the stem hole being smaller. Figure 140 shows one type of tube evidently presented directly to the mouth in smoking. Others may have had a separate stem. While most tubular pipes are of sandstone, one specimen shown in figure 140 is made of

highly polished banded slate. And another is engraved in a manner suggesting pictorial writing.

In the large area south of the Ohio River and east of the Mississippi there are quite often found large pipes of the form shown in figure 141. These pipes are usually quite large, and heavy, some being of several pounds weight. They are engraved to represent a great variety of birds and animals, the execution of the engraving being usually of a high order. Many of these beautiful pipes from Kentucky are figured by Moorehead. The collection of Col. Bennett Young contained many and McGuire represents two very interesting specimens found near Lexington, Kentucky.

A pipe of this type now in the possession of Dr. N. D. Stigall, of Burnside, Kentucky, is shown in Figure 142. This

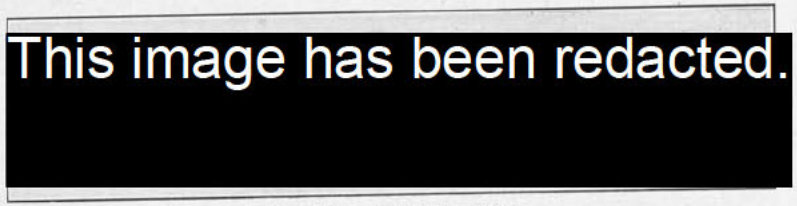


FIG. 142. ANIMAL PIPE.
Three views of an interesting pipe found in southern Kentucky.

pipe has been in his family several generations, being found in 1820 at "Double Head Spring," two miles west of Burnside, down the Cumberland River. The spring was named for an old Indian chieftian known to the early settlers as Double Head, who lived in a cavern near this spring for a time after white men began to settle the surrounding country.

The pipe shown in figure 141 was found according to the record of Mrs. Charles Bolinger of Maysville, about 1890 by Miss Helen McKinney, who was then secretary to J. C. C. Mayo. The pipe was found under the cliff at the Jenney Wiley Ford, near Mudlick, 8 miles from Paint Lick. This cliff and ford according to "Ely's History of the Big Sandy Valley" were named for a girl captured by the Indians in the early settlement days, and left tied under the cliff. She escaped by creeping under a small stream of water from the cliff, and by getting the cords wet that bound her, she released herself.

A specimen of the Monitor Pipe, which is not very common in Kentucky, and also a good example of the Micmac type are shown in figure 143. These types are found along the northern boundary of the United States and into Canada and are particularly numerous in the Great Lakes region. The finding in Kentucky of Micmac pipes is unusual, and it would seem that they are to be regarded as strays, here by the accident of trade or travel. In figure 143 is also shown a very beautiful specimen

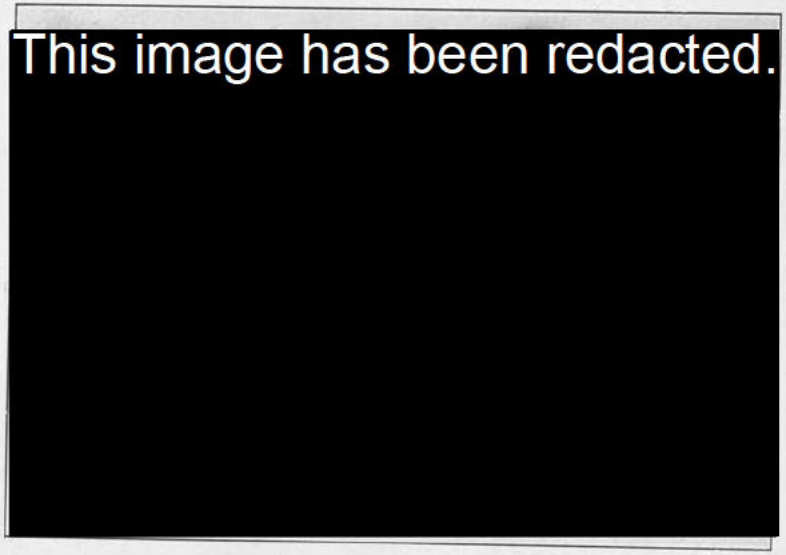


FIG. 143. INTERESTING FASHIONS IN PIPES.
Showing in the upper left-hand corner a micmac pipe, in the upper row a Cherokee pipe with animal design, in the center a monitor pipe and a disc pipe, and in the lower right-hand corner a pipe made from a concretion.

of disk pipe ploughed up in a field in Bourbon County, Kentucky. This type of pipe is very interesting, in as much as it was designed to be and is without a stem. The hole in the disk is in effect a stem hole. The pipe was smoked by pressing the lips of the smoker against the disk holding the pipe by the long handled bowl. This specimen is made of catlinite, or the red pipe stone of Missouri. It has on one side of the handle pictographs of two human figures apparently in combat. On the other side is a very well executed figure of an alligator extending the entire length of the handle.

The double conoidal pipe generally regarded as a very ancient form is well represented in Kentucky. The name is given because of the characteristic bowl and stem holes, being each a cone, usually of the same size, reamed out at right angles to each other, so the tips of the cones intersect. This produces a stem hole the same size as the bowl, and would require a specially adapted stem for service. Figure 144 shows three very handsome specimens of this form. The middle specimen was found in Franklin County and is made of a block of carbonate of iron

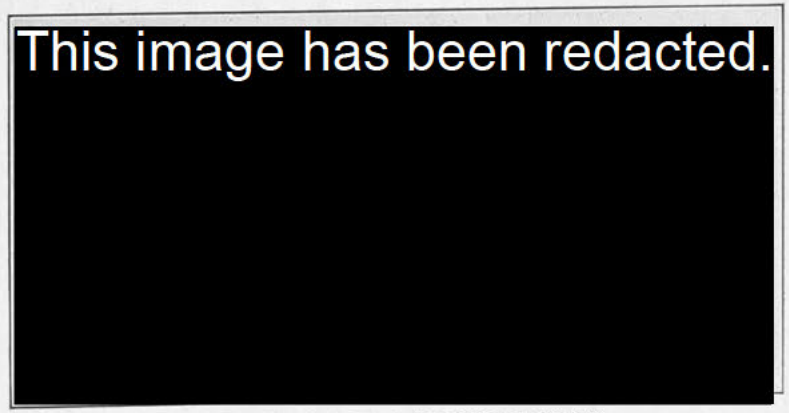


FIG. 144. DOUBLE CONOIDAL PIPES.
The bowl and the stem-hole are both cones which meet each other at their tips.

weathered to hematite on the outside. The right-hand specimen is of sandstone, and shows a human face carved on opposite faces of the pipe. While Col. Bennett H. Young reported double conoidal pipes found in graves and in mounds, the authors' records on such pipes show that they are usually ploughed up in fields showing no apparent connection with any prehistoric grave or dwelling site.

The ovoid pipe made of limestone is shown in figure 145. There is also shown a number of small ovoid pipes, a very common form on sites known to be of the Fort Ancient Culture. These small ovoid pipes are usually of sandstone, and have little or no decoration. They are usually found in very similar association with the vase shaped pipe also shown in the center of the figure and with the small elbow pipes, also typical of the Fort

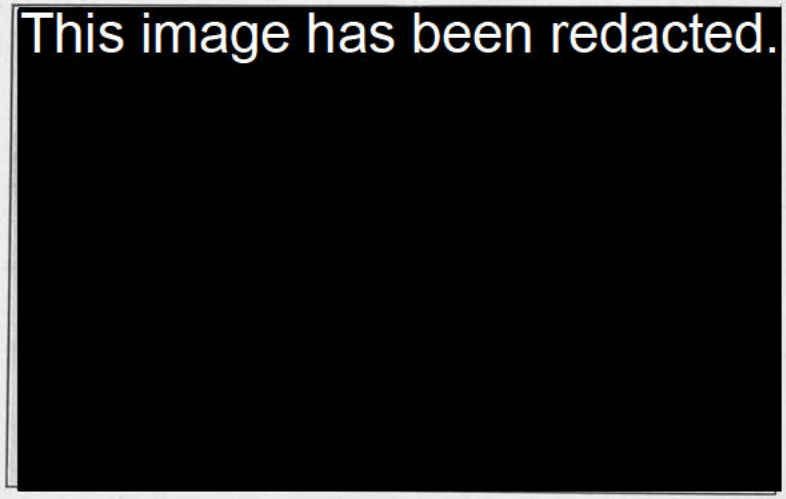


FIG. 145. OVOID AND ELBOW PIPES.
Uusually of sandstone and without decoration.

Ancient Culture. Many of these small ovoid and elbow pipes are quite small, holding only a very small quantity of tobacco. The authors have taken these pipes from graves and mounds where

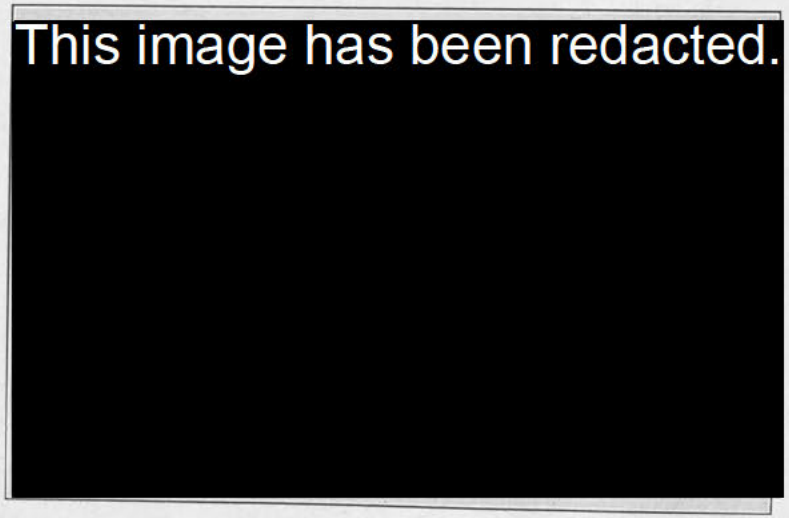


FIG. 146. TOTEM PIPES.
Showing a headless frog, a deer foot, a turtle, a snake head, and other tribal or individual designs.

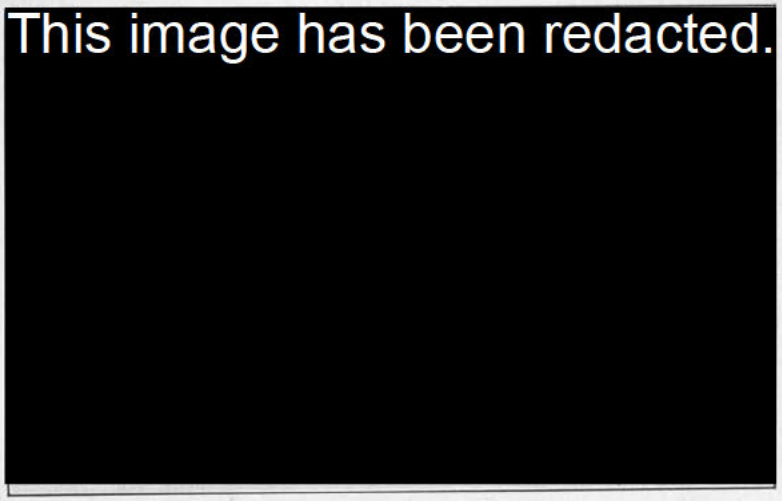


FIG. 147. TOTEM PIPES.
Showing a turtle, a deer foot, a quail, an owl and a fox.

the ashes and charred remains of the smoking material still remained in the pipe and the odor of nicotine was quite pronounced.

There is a type of pipe often found in the fields of Kentucky, small in size, representing the figures of birds, animals, human faces and other objects which are very different from the heavy animal and bird pipes of the South. These pipes the authors have called totem pipes for the lack of a better term, upon assumption that the carved figure may represent a totem or tribal or private symbol. In figure 146 there are shown a

FIG. 148. FACE PIPES.
From the collection of Mr. W. J. Curtis.

number of these pipes. The frog is quite a common representation in these pipes, and several have been found representing the deer foot particularly well executed. Figures 147 and 148 show additional totem pipes all from collection of Hon. W. T. Curtis.

It is quite a common occurrence to find in mounds where burials are located, and in other burial sites, unfinished pipes of a variety of forms. It would seem that these unfinished pipes are presented as offerings to the dead, perhaps with the notion

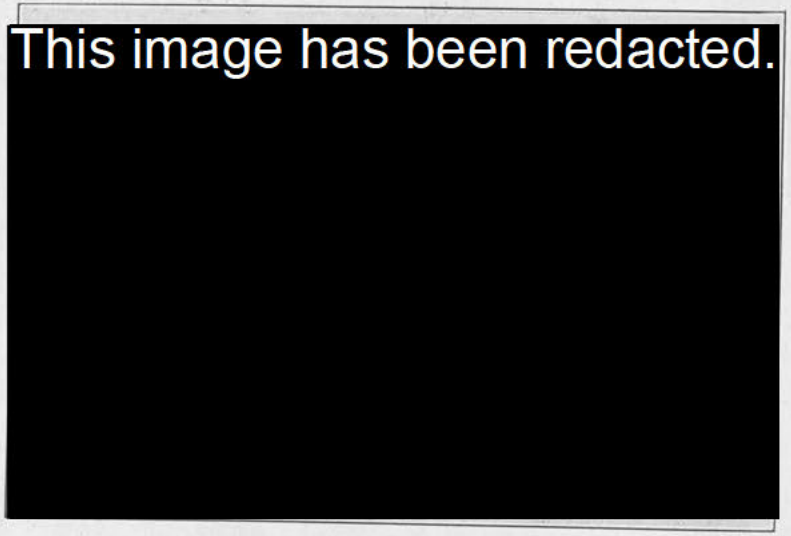


FIG. 149. UNFINISHED PIPES.
Which give clews as to how they were made.

that the deceased would finish them in the Spirit World. A study of such unfinished forms gives a clue as to how the finished specimens were made. In general they were rough pecked into form, and then drilled or reamed out. The polishing was usually done after the drilling. This would seem to indicate that the drilling was rather a crucial test of the material of the pipe, and that if it broke while being drilled before polishing, the work of polishing was thus not lost.

The large elbow pipe shown in figure 149 was taken from the general digging of a mound in Montgomery County by Mr.

Clell Cockrell of Mt. Sterling, and was seemingly not in association with any burial. An inspection of the specimen seems to indicate that the material developed a flaw, and broke while being bored. It was then discarded, perhaps on the village site, and when the mound was built it was gathered up along with other camp rubbish and incorporated in the mound.

There is occasionally found in Kentucky pipes of the general Siouxian type, made of catlinite, and seemingly indicating by their engraving that the maker had contact with historic civilization. Figure 150 shows two of these pipes. It is interesting to note that one specimen in figure 143 having all the ear marks of a rather old Siouxian pipe was broken half in two at the stem. The two portions were carefully matched, and a lead

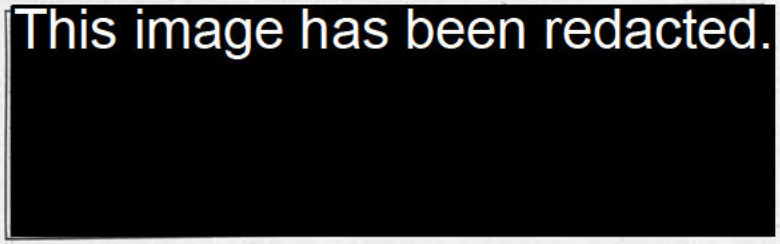


FIG. 150. SIOUXIAN PIPES.
Shapes and designs which suggest contact with the white man.

band placed about the break. It was driven into the notches and so holds the pieces together. It is believed that this mending as well as the pipe is prehistoric, and if so, shows to what extent prehistoric man would go to save his pipe after damage.

In concluding this brief statement on early pipe forms, it should be remembered that as smoking merely for pleasure was a custom introducted by white men, so we should expect to find many individual pipes showing contact with white civilization. Many such pipes while unquestionably made by very primitive means, and doubtless made by Indians, are of such form as to clearly indicate white contact. Again many specimens show in their manufacture the use of a metal file, indicative of relatively late manufacture, when it was possible for even Indians to be in possession of metal tools obtained from white traders. In early Colonial days, "trade pipes" of pottery, metal,

and other materials were supplied by English, French and Spanish traders, in large quantities, to the tribes with which they were in contact. Such pipes are often found today in known village sites and in cemeteries where burials took place during the early Colonial period. Two such pipes are figured in the chapter on miscellaneous artifacts.

A class of artifacts showing very considerable skill in manufacture is the so-called discoidal. These are circular disks varying in diameter from one inch to eight inches and from one-fourth inch to two inches in thickness. They are made of a great variety of material, and are generally very highly polished. The surfaces though sometimes plain, are generally concave. In a few cases the surfaces are convex. In many of the concave forms there is a secondary depression at the center. The symmetry of some discoidals, the high polish of the surface, and the concavity of the faces would in certain cases suggest

FIG. 151. DISCOIDALS.
Well made and highly polished artifacts which are supposed to have been used in playing "Chunkee."

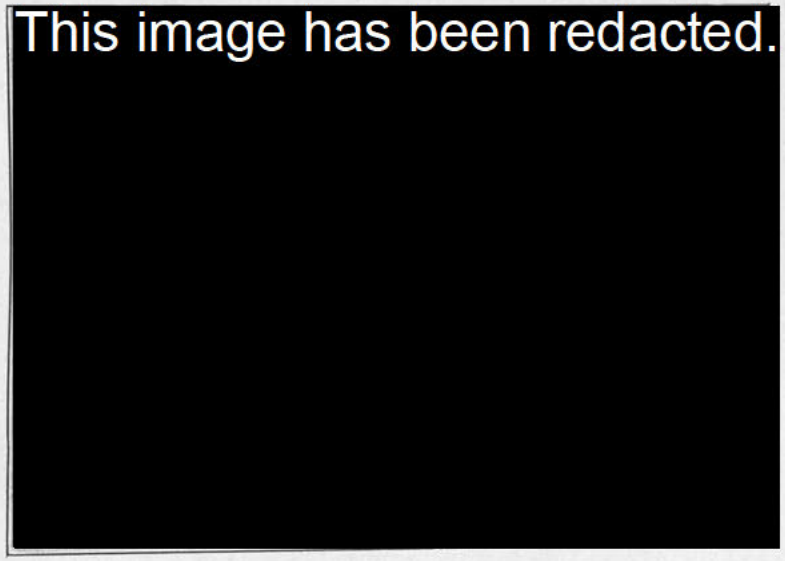


FIG. 152. GAME STONES.
Believed to have been used in some ancient form of gambling.

that their makers had some manner of rotating the specimen while grinding it into shape.

The curvature of the concave surfaces of the discoidals varies greatly in different specimens. Some are nearly two inches thick at the outer edge, and are hollowed out on both faces so that the center is quite thin. In some specimens made of quartz, the center is so thin as to be translucent; in a few cases the disk has been drilled through the center. Figure 151 shows a number of different forms of sandstone, quartz, quartzite, greenstone, granite, limestone. The larger discoidals, while not numerous in any locality, are found on old village sites, in Southern Kentucky. The counties along the Cumberland River have yielded more of these large specimens than all the rest of the state.

It is generally supposed that these large discoidals were used by the Creeks, and related tribes, in the game called "Chunkee." This name was used by the early traders to describe a game played by all the tribes in the Gulf States. The game consisted of rolling a discoidal stone on the ground and sliding or throwing forward a stick having a crook at one end. The object was

to so throw the stick that when disk and stick came to rest, the disk would lie within the crook. Early traders among the tribes of the Southeastern United States report that every Indian village had an area cleared and prepared within or adjacent to the village for playing this game. This area was called the Chunkee yard. While it is doubtless true that some discoidals were perhaps used in the game of Chunkee, yet there is such a wide variation in diameter, thickness, and material that it is difficult to believe that all discoidals were used for any one purpose.

Besides the discoidals of a wide variety of form and material, particular attention should be called to the so-called "game stones" quite common in Kentucky, on known sites of the so-called Fort Ancient Culture. These game stones are made of sandstone, and vary from three-fourths of an inch to two inches in diameter, and are all about one-half inch thick. They are usually thicker at the edge, the center being hollowed out, and engraved. This engraving takes the form of concentric circles, radial lines, and dots, or various combinations of these. In rare cases figures of animals and human figures are engraved on these disks. It is supposed that the engraved circles, dots, and lines, served to designate the value of the disk in the game played, the disks serving the purpose of counters.

In general two faces of the game stone are engraved identically, having the same number of lines, dots, or circles. However, in one specimen in the author's collection, containing several hundred game stones, the face of the disk is divided into four quadrants, the opposite face being divided into five parts. Because the vast majority of such stones are identical on both sides, it is thought this specimen represents a deliberate attempt to produce an unusual type, perhaps to cheat as a counter in the game. Very rarely these game stones were made of limestone. Usually when so made a very compact stone was selected. In some 300 stones in the author's collection there are five made from very white marble.

Closely associated with the engraved stones, as a type, similar in size and material, not engraved and often drilled through the center, and on sites revealing game stones of sandstones, in any great number, there are usually to be found a few made

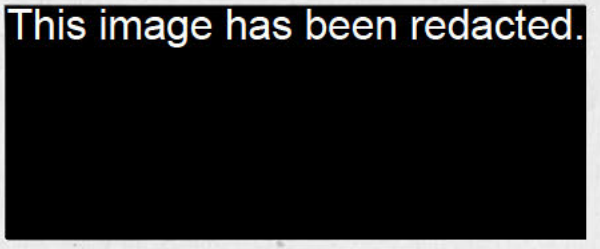


FIG. 153. DECORATED GAME STONES.
Inscribed with designs of unknown significance.

from shards of broken pots. The pottery disks are usually much thinner at the center. The fact that the pottery shard was curved and not flat seems not to have hindered its use in the manufacture of a disk.

In addition to various ground stone artifacts, made by primitive man, as already described, which were all of utilitarian value, there is to be found a vast array of very beautiful ground stone objects, the actual purpose of which in many cases is not surely known, and in a number of cases is only conjectural. By early writers these artifacts were classed as ceremonial forms and present day usage assigns to all the artifacts the term problem-

FIG. 154. SLATE GORGETS.
The second specimen in the lower row is believed to be a "record" gorget.

atical. This term is certainly more descriptive and indicates that our knowledge of the use of many of these forms is yet a problem to be solved. Only the most common of these forms will be discussed here, certain of the rarer and unusual forms will be considered in the chapter on miscellaneous artifacts.

There are several forms of stone artifacts occurring in large numbers in Kentucky which seem to belong to the problematical class, namely, gorgets, pendants, plummets and banner-stones. As has been pointed out by other writers, these artifacts vary so greatly in form and so gradually, that it is possible to pass from one form thought to be a type form to another of absolutely different type, by steps so gradual that the transition seems quite natural. In attempting to discuss gorgets, no fixed line can be drawn separating them from pendants on the one side and banner stones on the other.

Figure 154 shows a few of the type forms of gorgets usually made of brown and black banded slate or other relatively soft materials. They are highly polished, and drilled with one, two, up to even five or more holes. In many cases these holes seem to have served the purpose of suspension, yet in other cases of similar form there are no drillings. In figure 154 is shown a gorget of dark slate, containing notches carefully cut in the edge. These notches are not regularly placed and are not apparently decorative. It is conjectural, that this may be a record gorget, and the notches serving as the record of events. It is generally assumed that gorgets were worn as ornaments, having in some cases a ceremonial significance.

Many pendants, used as ear ornaments, are quite similar in form to gorgets, though somewhat smaller. We have found a number of pendants made from river pebbles, banded slate and one from a stone similar to that found occasionally in the stomach of cattle. Such stones were thought by some to possess virtue in extracting the virus in the case of mad dog bite, and are called by some "mad stones." Perhaps this stone was found by an Indian in the stomach of a deer or buffalo. If such was the case it could not fail to attract the attention of primitive man who would certainly regard it as great medicine "mystery" and this may explain why he converted it into a gorget or pendant.

FIG. 155. EAR ORNAMENTS.
Often found with the skulls of prehistoric individuals.

While banded slate was greatly used for gorgets, a variety of other material, soft enough to be drilled was also used. There are also gorgets of soap stone, some of an ore of iron and others made from flat limestone water worn pebbles. This last kind was found by the authors in one of the Reed caves, in Hart County.

Beside the flat pendant type of gorgets, the long thick bar shaped gorget, heavier in the center, sometimes drilled with two

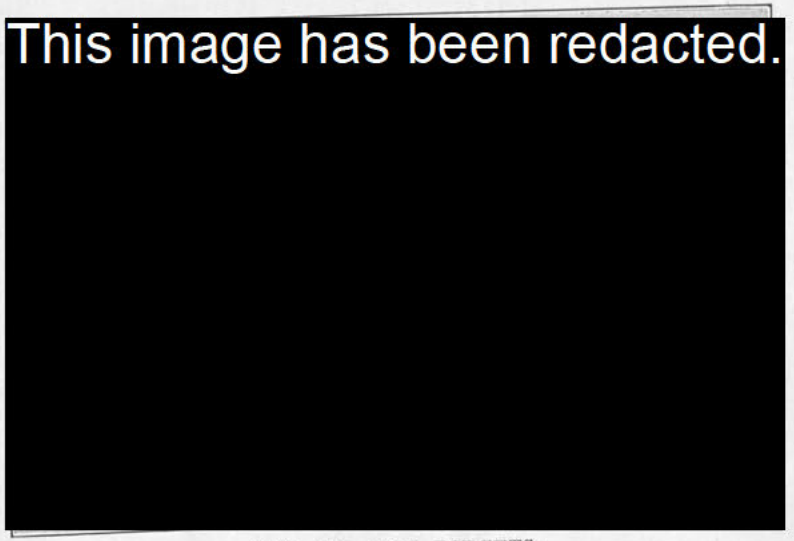


FIG. 156. BAR GORGETS.
Uusually thick in the center and drilled with conical holes.

holes and sometimes undrilled, is a fairly common form in Kentucky. Figure 156 shows a number of these.

It is worthy of note that while some of these highly polished gorgets were not drilled, without exception those that were drilled have only the conical hole, indicating the use of flint drill or reamer. This would seem rather remarkable, for banner stones, usually found associated with gorgets, and made in general of the same material are always drilled with the reed drill, and have therefore only cylindrical drillings.

FIG. 157. BANNER STONES.
Supposed to indicate the rank or office of the owner.

In as much as these bar shaped gorgets, heavier in the center, are flat on one side, and convex on the other, it has been suggested that they were worn on the left wrist, serving as a protection to the wrist in the use of the bow. The gorget would ward off the blow to the wrist of the bow string when the bow was released, and because of its smooth surface and high polish would do no injury to the bow string.

The grinding and polishing of stone reached its highest perfection in the manufacture of banner stones. These beautifully wrought artifacts have been the subject of much discussion as to their purpose and use. The name suggests that they were mounted on a pole and carried as a standard. It has been suggested that they were emblems of authority, and denoted rank and position. It is supposed they were carried only by those entitled to this privilege, and may have been borne into battle, serving as a standard, to indicate the presence of the one in command, and in time of disaster might become the rallying point of the group.

Others have suggested that they had a ceremonial significance, and were not for individual but rather for tribal use.

Moore found at Indian Knoll, in Ohio County, a peculiar form of banner stone in considerable numbers, and concluded that in weaving fish nets they were used as net spacers.

Some writers profess to see in certain wing types of banner stone an attempt to represent the outstretched wings of the "Thunder Bird," a mythological creature held in great veneration by the very early historic Indian. They assert their belief that the banner stone, carried on a pole, was decorated with tail feathers below and head and skin of a bird above, to complete the representation, the whole staff being used by the medicine man in certain ceremonies.

Whatever else may be said, the banner stone remains a problematical form. Its varied form, and exactness of manufacture, testify to the high esteem in which it was held. Its wide spread distribution argues an important place held by it in the life of primitive man over a great area. The beauty of the stone, as well as the skill shown in its manufacture, are at once both the admiration and the despair of the student of pre-history.

Another problematical form, regarded by many as showing as skilled workmanship as the banner stone, is the so-called plummet. The plummet obtains its name for a similarity in form to the plumb bob of the mechanic. They are made from a great variety of materials, quartz, granite, hematite (being common) and rarely of banded slate. They are usually highly polished

and the small end furnished with either hole or groove for suspension. Many have considered them as ornaments, to be worn as pendants. There seems to be some reason to believe they may have had a ceremonial significance and were worn as charms. They are often found associated with burial, usually a single plummet in a grave. However, if they were ceremonial charm stones, or personal ornaments, it is difficult to understand why in certain rare cases a large number of plummets have been discovered in one place. These discoveries seem to indicate that the plummets found represented cache or storage of a supply.

FIG. 158. PLUMMETS.
Artifacts of problematical use which are named from their resemblance to a modern plum-bob.

One very interesting theory which has been advanced to account for the association of a large number of these implements is that they were used in the process of weaving. It is thought that the warp straws in a crude loom were each attached to a plummet, which kept the straw under uniform tension during the weaving. Being so well made and highly polished it was well adapted to such use, and did not entangle itself in the fiber, as a rough and unpolished stone would do. Upon this theory, such a cache of plummet represents the remains of an ancient loom, the number of plummets being in a measure indicative of the

number of warp straws used, or the width of the cloth or blanket woven.

Plummets are plentiful in New England and along the Atlantic—also in California. They are found infrequently along the Ohio River Valley, those found in Kentucky being the very highly polished type.

Some have suggested that plummets were used as sinkers on fish lines and nets, but such would seem to be unable to account for the high finish on most Kentucky plummets. Some evidence seems to point to a possible use of plummets as the South American tribes use bolas. Two plummets tied together by a leather thong could, by being thrown, aid in the capture of wild ducks and geese when they were plentiful on the shore of shallow water. The basis for this suggestion is that in certain areas in the West, cultivated fields recovered by draining shallow lagoons, have yielded an exceptionally large number of plummets.

In conclusion when one contemplates the work necessary to cut from a block of hematite, a plummet, to fashion and polish it, and drill or notch this very hard material, and when one remembers that primitive man had no metal tools with which to work, and was acquainted with but few of any materials harder than hematite, one can but admire his skill as shown by the product, and his patience as is evidenced by the time and effort expended.

In thus viewing plummets we are rather driven to conclude that in general it is probable that the highly polished, well finished plummets found in Kentucky were not for utilitarian purposes, as weaving weight, line sinker, bolas, etc., but rather were charm stones worn as ornaments, and regarded with great veneration as "good medicine." This last would seem to account for the high finish, comparative rarity in Kentucky, and their association singly with graves.

Finally in the manufacture of ground artifacts, primitive man produced a great variety of implement, ornament, and problematical form, from a very great variety of material. So skillful was he that on one hand he could drill holes of half-inch diameter longitudinally through soft banded slate but very little thicker than the diameter of the hole, without damage to the specimen, and then polish the surface and work the whole to sharp edged winged banner stones, or on the other hand he could

drill and polish hematite, quartz and granite into celts, and plummets producing specimens of high polish and perfect symmetry, a task not easy for civilized men today, even with modern tools.

CHAPTER XIII

POTTERY

The manufacture of pottery by a primitive people is a good indication of the degree of their development. Pottery manufacture could develop only after man recognized his need for cooking utensils, water bottles, and like artifacts. During the period when man ate most of his food raw and was largely a nomad, he did not make pottery, but as his habitation became fixed or partially permanent, opportunity for family and village life made the development of the potter's art possible and as the advantage of cooked food began to be apparent, especially boiled food, early man learned of his own need for cooking utensils more elaborate than a flat stone or the half of a mussel shell. He satisfied this need in part at first by cutting vessels from stone, a slow and laborious task, acomplished with very primitive tools. Having learned by experience that the clay bed of his camp fire became very hard after long burning, he was doubtless led to the manufacture of the first very crude burned pottery. The earliest pottery was unburned, being only dried in the sun.

It has been pointed out by many writers on this subject, including Moorehead, Holmes, Moore and others, that the true potter's art had made little or no development north of the Ohio River in prehistoric times. The pottery of New England is quite crude and relatively rare. The Iroquois of the New York region had but little pottery beyond pipes and a few other very simple forms. The great center of the development of prehistoric pottery on this part of the continent lies in Tennessee and the states to the south. A region of very highly developed pottery lies along the Cumberland and Tennessee Rivers in Tennessee and Kentucky. The excavation by Moore on the Black Warrior River in Alabama and among the stone grave people of Tennessee has yielded such a numerous and varied collection of prehistoric pottery as is probably not equaled anywhere else in the world.

From this great center of cultural development, Kentucky has received large contributions, by way of influence in development, as well as by actual transfer of manufactured specimens.

It has been pointed out by many writers that the manufacture of pottery was woman's work, that the art of pottery construction and decoration was taught by the mother to the daughters, and that in prehistoric times woman was a chattel or slave, to be bought, captured, or sometimes stolen. It is doubtless true that women often thus were taken from one tribe or race into a people of quite different habits and customs. Under such circumstances it would be natural to assume that in her new home she would make and decorate pottery for her household after the manner she had been taught in her former home. This idea has been advanced to account for an apparent mingling of pottery forms in areas where many of these forms apparently should not be found. For this reason pottery artifacts are not usually regarded as definite and final proof of a given culture and in a given area. Such evidence is only corroborative.

In Kentucky most of the pottery discoverable today seems to be predominantly of the type designated as Fort Ancient Culture. Particularly is this true of the fragments of shards so common in village sites in northern and eastern Kentucky. Along the southern boundary Cherokee and pre-Cherokee influence is apparent and occasionally a perfect specimen is located with characteristic decorations of the zoormorphic forms. In the western portion of our state the water bottle seems to have been highly developed, if we may judge by the number of specimens discovered, and the excellent character of the manufacture. It is suggested that this development may be connected with the so-called River People who were probably Algonquin stock, and who were supposed to have been pushed westward and southward about the time of the Iroquois invasion of the Ohio River Valley. Certain it is that the typical water bottle of Western Kentucky is quite similar to pottery of western Tennessee and of Arkansas.

In the manufacture of pottery all tribes and races seem to have followed the same general principles. Harrington has given a most excellent report on the method used by the historic Cherokee in producing a product very similar to the prehistoric pottery of the south. Doubtless this method or one very similar was in general use among all early peoples.

Clay of a proper quality and color was selected and made plastic by kneading with water. A ball of clay after working was flattened into a disk of proper size and thickness, and made slightly convex. This became the oval bottom of the dish, bottle or pot. Clay was then rolled between the hands to form long cylindrical pieces about the size of one's finger and a foot or more long. These were coiled about the edge of the disk, pinched on with the finger to bind both together. By the continued process of coiling such pieces the vessel took form. The pinching process left the surface somewhat rough. This was brought to form by the use of a small paddle which when applied with skill kneaded the surface together into a compact whole and rendered it fairly smooth. That this method was used in prehistoric time there can be little doubt, as an inspection of some pot shards will disclose the successive layers used in manufacture, imperfectly united in the inside of the vessel where it was probably impossible to use the kneading paddle.

A very important item in pottery manufacture was to obtain a clay mixture that would stand firing without cracking. This required some material for "tempering." We know today that some form of lime is desirable and early man somehow discovered this very important fact and turned to a supply both abundant and easily obtainable in a pure state and convenient form. Mussel shells today furnish us one source of chemically pure lime. Early man ground mussel shell to a coarse powder, and mixed it with his clay and this tempered the clay in the burning process, and enabled him to "hard burn" pottery that would not crack, and would be "water tight"

In the investigation of pot shards about old village sites it is easy to discover shards that show the result of use about the camp fire. Often such vessels used for cooking are covered with soot on the outside, as one might expect. This coating of soot by successive burnings has become as hard as the original pottery, This is not surprising, but it is a matter for speculation when one finds some of these shards also covered with soot on the inside. In a single example it might be considered merely an accident which occurred after the vessel was broken, however, when one

finds whole vessels with a soot coating on the inside one naturally seeks a reason.

It has been suggested that the Indian made use of pots to carry fire from point to point, and so placed live coals in such a vessel for preservation. This explanation might account for the soot on the inside of a few vessels, which may have been used yet on certain sites nearly all of the shards seem to have been blackened on the inside.

It is thought that Harrington's report of the custom of the early Cherokees in this connection was a common practice. When a pot was being fired, while it was still white hot during the burning, a handful of broken up corn cobs was dropped into the pot which, taking fire, covered the interior of the pot with soot. This was done to fill the pores and render the interior surface water proof, and prevented the food cooked in the vessel from soaking into the pores. The vast majority of pottery specimens found in Kentucky shows this interior sooting.

Another method used to give form to large and open pottery vessels seems to have been to weave a coarse basket of grass or reeds of the desired size and form. Clay was then plastered on the inside of such basket to the desired thickness. During the burning process, the basket was burned off leaving on the outside of the vessel the print of the woven grass and reeds. This gave to the pot surface a decoration characteristic of this method of manufacture. In the method of building up a vessel by coiling ropes of clay and paddling into shape, the paddle was often decorated by incised figures which were thus left stamped on the soft surface of the vessel. Occasionally a bundle of leaves, stems, or grass was used as a paddle which left its characteristic imprint in the surface and tells today the character of the paddle as well as the method of manufacture.

In the higher forms of pottery, considerable artistic ability was demonstrated in decoration. This usually took the form of serrating or fluting the edges of the vessel, the attachment of handles or lugs and in incising figures on the outer surface. In most cases of Kentucky pottery, the incised decoration is not elaborate, such as Moore found in Tennessee and Alabama, but consists in the main of cross hatched lines and dots worked into a conventional design.

While much pottery was hard burned by the maker, yet it was all of a primitive sort, and could not compare in lasting qualities to modern pottery made at high temperature and glazed to glass hardness. Most aboriginal pottery therefore, when exposed to the action of water, soil and frost soon decays and disintegrates even if it escapes mechanical damage or accidental breakage. There is to be expected therefore but little evidence of the potter's art, except in places where such artifacts have had unusual opportunity for preservation. Today the ancient village sites yield only broken shards partially decayed and with decorations all but obliterated. There appear to be only two sources where there is any hope of finding pottery in a fair state of preservation. These are the caves of the state, and such graves in ancient cemeteries as are quite deep, below the frost line. Occasionally there is found perfect specimens of pottery in mounds, but such are always in association with graves.

For the purposes of this chapter pottery artifacts may be classified as follows:

a. Large pots for camp cooking
b. Bowls and cups for household use
c. Water bottles
d. Mortuary vessels for food
e. Burial urns
f. Storage bins
g. Pipes
h. Beads and ornaments
i. Rattles
j. Pottery marker, dish covers, bottle stoppers
k. Colanders
l. Disks—Made of shards

There were doubtless many other uses to which the potter's art was put, but this list seems to include all the major uses revealed by a study of Kentucky pottery.

On many prehistoric village sites in our state there is to be found the ancient hearth and camp fire sites. Usually it is found to be a ring of large stones laid in a circle some 12 feet or more in diameter. Sometimes a considerable area is floored over with river pebbles or flat stones from the hillside ledges. Covering all is a heavy layer of ash indicating long and continued use of a camp fire—perhaps serving a whole village or at least many

lodges or families. About such an ancient hearth in and about the ash layer are generally to be found many shards of broken pots, along with the other camp debris.

Many of these shards, are rim shards, and have handles still attached. Often enough remains of the pot rim to give a fair indication of the size of the pot, from the curvature of the rim. It is not uncommon to find portions of pots about such old hearths, which would seem to indicate that the pot must have been two feet or more in diameter, and perhaps as deep. Such

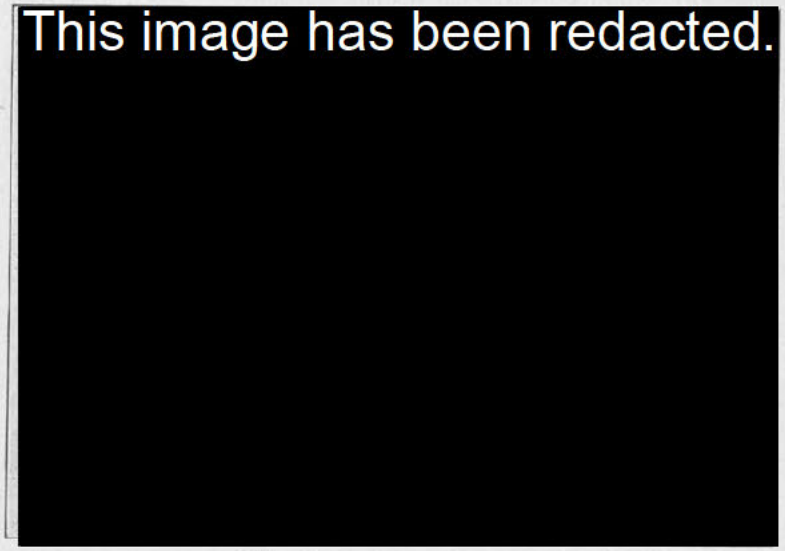


FIG. 159. POT HANDLES.
Various types of lugs or handles from ancient vessels. Most of them show the flakes of mussel shells which were mixed with the clay for tempering.

a pot could hold 25 to 40 gallons when brim full and it would appear would be well suited to serve as a camp kettle for a whole village. Figure 159 shows a collection of such rim shards with handles attached. These indicate a high grade of pottery, well burned, and artistically decorated. It is believed that no matter how well the handles were attached, the pot was too large and much too heavy when in use to have been lifted by these handles. Therefore the purpose of such handles was largely decorative.

A number of the body shards of these pots showing various incised decorations, some of considerable artistic merit, are presented in figure 160. These forms of decoration are typical of the Fort Ancient Culture, and have been found in quantity in Greenup County, Mason County and in smaller quantities in Scott County and Nicholas County, by the authors. These decorations are all of large form, and argue a large pot of a size suitable for a camp kettle. On these village sites which produce many pottery fragments similar to figures 159 and 160 there

FIG. 160. SHARDS.
Showing a variety of types of decoration, some of rather interesting design.

are to be found also other types of handles and decorations for smaller vessels. The flat handles were pinched on rather insecurely. The circular handles had a hole pushed into the pot wall into which they thrust. This amounted to "riveting" them to their seat. Besides these types of handles Fort Ancient Culture used a variety of lugs for decorative handles.

In addition to the manufacture of large pots for general camp use there was an extensive use of smaller vessels—open bowls of a very simple form as shown in figure 161. These were

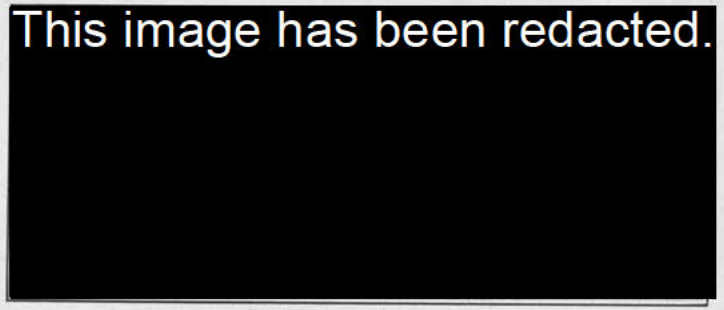


FIG. 161. BOWLS.
Probably for individual use.

evidently for individual use, made usually without handles or other decorations except at the rim which was sometimes notched, fluted, or decorated with dots or other small figures in relief. A group of these rim shards is shown in figure 162.

At Fox Field, (typical Fort Ancient Culture) is to be found a very unusual type of pottery—shards which appear to be the bottom of open bowls closely perforated. These perforations in

FIG. 162. RIM SHARDS.
The lower row shows pieces of colanders, some of the holes in which have been drilled after burning.

any individual vessel are fairly uniform in size but vary considerably in different specimens. The smallest is about the size of the lead in a pencil, while the largest is about the size of the pencil itself. These perforations were made while the vessel was soft, being punched out with a sharp pointed awl. Some of the specimens were punched from the outside inward, others from the inside outward.

Several specimens have been found which show that during the firing of these perforated vessels, some of the perforations became partially closed. These were drilled out with the flint drill after the vessel was burned, leaving the typical conical hole.

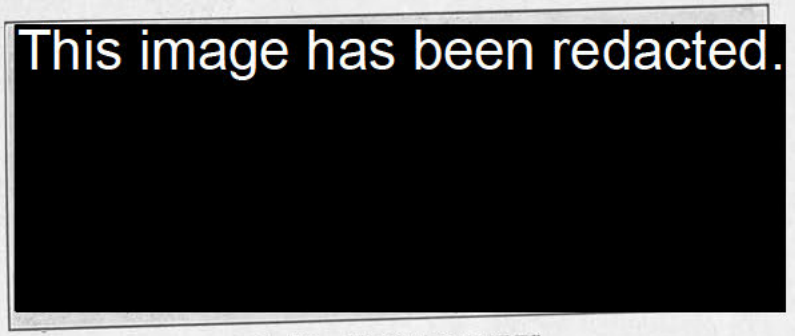


FIG. 163. WATER BOTTLES.
The large-mouth type common in western Kentucky.

These drillings were from both outside and from the inside in different specimens. It is believed this type of pottery colander is very unusual and so far as is known has not been reported elsewhere from the Eastern United States. So far no suggestion as to the use or necessity of such pottery strainers has been advanced. That they came into rather extended use at Fox Field is evident from the number of perforated shards still remaining on the village site.

Water bottles have been found in many places in Kentucky but chiefly in mounds in the western portion of the state. Figure 163 shows typical bottles of the wide mouth variety; other types have a very slender neck. It is believed that these are usually found on known sites of the River People, of Algonquin stock, or are in association with such sites. Such bottles were reported

FIG. 164. UNIQUE POTTERY PIECES.
Showing water-bottle stoppers, dish covers and shards of soap-stone bowls.

by Harrington from Lenoir Island, Tennessee. The mouths of these bottles when placed in graves were usually closed by a pottery disk, if the mouth was large, and by a pottery stopper if the mouth was small. These covers and stoppers being more difficult to damage than the bottle itself have persisted on the old mound sites, and have often been found separated from all other pottery. This has lead some investigators to suggest that they were tools used in the manufacture of other pottery.

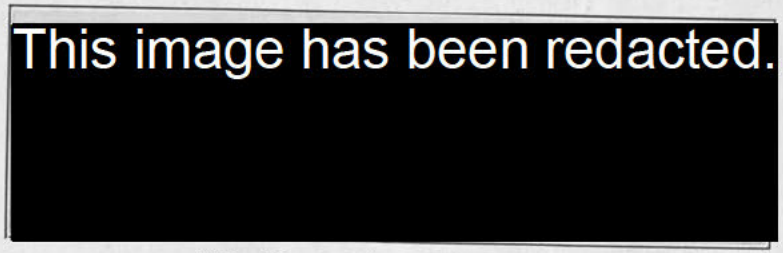


FIG. 165. MORTUARY VESSELS.
Which contained food for the trip to the "happy hunting ground."

A number of these covers and stoppers are shown in figure 164. The convex outer surface of some stoppers have been decorated with the exact pattern found on the body of the bottle. This fact has lead to the suggestion that they were pottery stamps, used for imprinting decorations on the soft clay vessel. It is ventured that most of these so called pottery stamps and pottery tools, are merely bottle stoppers, each being either smooth or engraved exactly like the bottle it was made to fit.

FIG. 166. POTS.
Types used by the cave-dwellers.

Throughout the state stone lined graves and grave mounds often yield perfect specimens of pottery which were evidently mortuary offerings. These vessels it is thought were made especially for this purpose and probably not used for any other. They are generally of the form of small pots of about a quart capacity or less, often decorated with two or four handles. Several are shown in figure 165 from various locations. Such a mortuary vessel from a stone grave at Fullerton Field was described in a preceding chapter.

Reference has already been made to pottery from the caves of Southern Kentucky. Figure 166 shows two pots discovered in a cave on Rock Creek near Sterns, Kentucky, by Armp Burks and J. L. Dobbs. The mouth of this small cavern had long been closed by a land slide but due to heavy rains a hole in the slide

opened in the spring of 1921. While these men were out hunting they discovered this hole and crawled into the cave. Signs of old fires were plentiful. The small pot was found on a natural shelf in the rock, in contact with the wall of the cave. So long had it been there, that the stalactitic material flowing down the wall had sealed the pot to its place, so that when lifted the outer surface of the pot came off, being left on the cave wall.

Over one of the old camp fires, a high flat stone had been supported in a slightly inclined position, and under one edge,

FIG. 167. A FIRST NATIONAL BANK.
Fragment of a pot containing wampum.

as if to catch the drip from a groove cut in the stone, the large pot was found. Burks disposed of this pot to Dr. Parrign of Monticello who had it in his possession for several years. No record is available as to its contents at the time found. It should be pointed out however that this pot appears to be quite similar to the burial urns discovered by Moore and others in the South. It is believed that this vessel was made originally for that purpose. Whether it was so used when found or not is not known. It is greatly to be regretted that the record in this case is incomplete.

Another form of large pot found on old camp sites is represented by exceeding thick shards, of very crude workmanship.

These shards are often an inch in thickness and seem in some cases quite unevenly burned. On the Ohio River bank below Lewisport, Kentucky, is a region where these large shards are quite plentiful. Every spring after the high waters had gone down, for several years past, portions of the river bank have caved in, exposing more of these broken pots. Some of them seem to have come from a depth of 10 or more feet down in the bank. It is observed, that the interior surface is rough and has a peculiar pattern. It seems to have been worked by the aid of a corn cob, and appears to have been produced by rolling a corn cob on the interior surface. This may be a suggestion as to the purpose of manufacture. From an inspection of the curvature of such specimens, it appears that these great pots were some four or five feet tall and perhaps three or more feet in diameter. It is believed that they were used as storage bins in the village where they were made, being placed some distance in the earth and covered over. Such shards of very thick pottery have been found by the authors on many distant and unrelated sites in the state.

One very interesting specimen of a large pot shard is in the possession of Judge John B. Wilson of Hartford. Judge Wilson reports that this shard, which is shown in figure 167, was ploughed up in an open field but in association with a quantity of broken bits of shell, each fragment drilled with a single hole and the edges worn down as if by long usage. This shard is about twelve inches long and almost flat, indicating that it was a part of a very large vessel. The shell pieces seem to have been stored in the pot for safe keeping so that this find may represent a cache of such shell fragments which were valuable either as ornaments or as a medium of exchange, in which case this pot may have been the prehistoric vault of the First National Bank of Ohio County, Kentucky.

It would appear that in the development of the potter's art the pipe appeared early, perhaps before utility vessels, but the mounds of this state have yielded relatively few pottery pipes. On certain sites belonging to the Fort Ancient Culture are found crude pottery beads and small pottery pendants. These are found in association with graves. Such beads are not found in

great numbers and it is thought that they were probably much more numerous than they appear to be, for it is very difficult to discover them when making excavations since they are not large and being the same color as the earth, one must search very carefully to find them. Undoubtedly many have been lost in such excavations, passing unnoticed by the observers.

Along the Tennessee and Cumberland Rivers in southern and western Kentucky, decorated pottery of the zoomorphic form reached a high state of development. Many very beautiful vessels representative of birds, fish and other animals have been found. With the exception of the wild turkey, the representations are generally of aquatic forms of life—the frog, turtle, fish and ducks being predominant. There were, however, occasional attempts to represent other animals in bowl form. Mr. Z. R. Williams of Uniontown has one pot well executed with animal head on one side and the tail on the other, the tail forming a handle. General Bennett H. Young figures a most beautiful ves-

FIG. 168. MISCELLANEOUS POTTERY ARTICLES.
Including pipes, pottery beads and pottery markers. The third specimen in the upper row is a marker designed to be rolled along to decorate the surface.

FIG. 169. ZOOMORPHIC POTTERY.
In which may be recognized the attempt to portray the heads of various animals and birds.

sel representing the wild turkey, the feet forming two of the legs of this pot.

Various sites in Kentucky yield evidence of zoomorphic pottery in the broken shards. Figure 169 shows a number of heads of animals and birds, with ducks predominating. So well executed are these heads, that many duck heads may not only be recognized as such but even the species determined. In this figure are also shown two heads of bears, and one duck head which is hollow inside. Into this hollow gravel has been introduced to form a rattle; it is supposed this rattle may have been an implement of ceremony.

The difficulty of obtaining a perfect specimen of prehistoric pottery at this time has become so great that in Kentucky, now, its finding is much more an accident than design. Each year more land comes under cultivation, ancient cemeteries and village sites are thus destroyed. Every year more caves in remote

places fall victims to the vandal who destroys all evidence of prehistoric man, while he searches for hidden "treasure." In his ignorance he does not know that the very evidence he destroys is his richest treasure.

Only recently during explorations in western Kentucky, a site was located showing much broken pottery, its destruction being recent. Upon inquiry, the owner of the land, ignorant of the value of such things from a historical point of view said he had "broken up this new land," last spring. The land he said

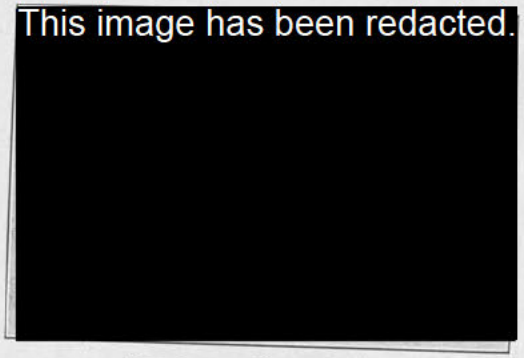


FIG. 170. DUCK BOWL.
A reconstructed piece showing an interesting design.

was worth about $40.00 per acre, and the corn crop he would raise he estimated at possibly $10.00 per acre above the value of his labor, if he was fortunate in getting a crop, and harvesting it before the fall rains caused the river to rise. When an attempt was made to explain to him the value of the evidence and specimens he had destroyed his statement was "When I ploughed I could hardly get the horses to hear me for the pots a'bustin'." He had very thoroughly and completely destroyed a small but ancient cemetery, and broken a score of pottery vessels buried with the dead. To one interested in prehistory such destruction is a tragedy—often repeated in Kentucky—because of a lack of information on the part of the average man and a complete lack of any law looking to the preservation of prehistoric sites.

A duck bowl taken from a cave in Southern Kentucky is shown in figure 170. It is but one of several saved from the

complete wreck and destruction of what must have been an interesting discovery.

Sometime ago Mr. F. E. Bradshaw, cashier of the National Bank of Burnside very kindly notified the authors of certain specimens in the hands of a very eccentric man living near Burnside who had offered these artifacts for sale. Through the assistance and kindness of Mr. Bradshaw communication was had with the owner of a specimen, which finally resulted in a visit to Burnside in an earnest attempt to obtain the record of the discovery. It developed after a careful investigation that the discoverer of this cave, an ignorant and illiterate man, making his living by hunting and fishing for pearls on the Cumberland River had while hunting somewhere in Pulaski or Wayne counties come upon a cave but recently opened by rain and land slides. He had found evidence of ancient occupation and several graves which he had dug out. The bones he said, in good state of preservation, he threw out, finding several pots, which he also "shoveled out." After the work of destruction was about completed, he discovered a few beads, which he thought to be pearls. These stimulated him to further exertion so he dug through the whole floor of the cave looking for "treasure" which he said he had been told was always "hidden in pots."

Not being able to complete the job in one day he made several trips to the cave—in fact he "worked off and on all winter" unearthed many pots along with skeletons, but found no more pearls. On one occasion he took with him several boys who being too small to dig amused themselves by gathering the pots dug up and taking them to the mouth of the cave, setting them up at a distance and making them the targets in a rock throwing contest. The contestants were quite successful in breaking all the pots. This very ignorant man seemed to fear he had done wrong in "robbing the dead" as he said—so made no mention of his discovery till he learned from a friend that the three shell gorgets made from the carapace of the box tortoise, figured elsewhere might have some value as relics. He then sought assistance in selling what he had found of the pottery which he had regarded as worthless. He was able to obtain only the piece in figure 170 which could be restored. From him a quan-

tity of shards were obtained, taken from this cave, most of them showing recent breakage. A diligent attempt at restoration failed because there were fragments from many vessels, but not enough of any one vessel to make the restoration worth while. However remains of two and possibly three "duck bowls" were in the shards obtained.

As distressing as such experiences are from the standpoint of the meagerness of the information in, and artifacts obtained from a site so rich in possibilities, the most disappointing part of this record remains to be told. The discoverer of this cave flatly refused to reveal its location, even in a general way. He first said it was six, then ten and finally eighteen miles from Burnside and at first said it was in Pulaski, then in Wayne County. Although offers were made to pay for his time allowing him to keep everything he found and not to disturb him in further destruction of its contents he refused to guide any one to it, or allow a photograph to be taken, saying "the information was worth as much to him as to anyone and if he had anything to sell he would let it be known."

Such ignorance and unparalleled stupidity is difficult to imagine, yet it does exist in many places in our State off of the beaten track of progress, and it is only in such communities now that there is any hope to make unusually interesting discoveries.

Having seen such incidents as the above many times repeated in various ways, the prediction is ventured, that while there must still remain a quantity of pottery artifacts, still but little damaged, in the caves and other ancient sites of our state yet it is true that if the present ignorance of the historic value of such things remains, only a very insignificant portion of such artifacts, when discovered, will ever reach museums or the hands of private collectors where they will be saved from destruction.

CHAPTER XIV

MISCELLANEOUS ARTIFACTS

In considering the whole range of artifacts made by primitive man we find many whose purpose is either wholly unknown or only partially understood. Some of these are relatively rare in occurrence and when found are in such varying associations as to give no clue as to their tribal or cultural source and but little hint as to the purpose of their manufacture. Such artifacts are usually denominated problematical forms. Again there are artifacts the use of which is known but which are of rare occurrence in Kentucky either because they existed in relatively small numbers or because from their nature they have been destroyed by natural decay. The form and material of some of these artifacts would not permit their being included in any of the preceding chapters and they are therefore now considered under the title of Miscellaneous Artifacts.

Chief among such artifacts may be mentioned:

a. Boats stones
b. Bird stones
c. L. gorgets
d. Spatulate forms
e. Whet stones
f. Paint cups
g. Bow-string sizers
h. Bar amulets
i. Pointed pendants
j. Ceremonial axes
k. Decorated cylinders
l. Pictograph writings

Boat stones are a well recognized type of artifact but are not common anywhere and are only occasionally found in Kentucky. They have been picked up on the banks of streams, plowed up in fields under cultivation, and in one case found near an ancient camp site. So far as the authors are aware, they are never found in caves, in mounds, or in any association with graves. They are made of a variety of material: granite, slate, sandstone, serpentine and other hard stones. They are carefully made and highly polished both inside and out. Some are drilled with two holes and some are undrilled. They are generally concave but are sometimes flat on one side and concave on the other. The name has been given to them from their crude resemblance to a small boat or canoe. Because their number is so

relatively small and yet their occurrence extends over the whole central and eastern United States, they have long been a problem to archaeologists.

In as much as they are never found in association with graves, it would seem conclusive that they were not objects of ornamentation or of veneration. Since there seems to be no way to ascribe to them any utilitarian purpose, and since their great variation in form would seem to preclude their use as a tool for any special purpose, they have generally been regarded as ceremonial artifacts. The patience and skill shown in their manufacture seem to argue a ceremonial significance. Here is indeed a problem—a highly developed ceremonial object, yet not an object of veneration; rare in occurence, an object not to be kept in camp, dwelling or cave, not valued as a tribute to the dead, yet carefully made and painstakingly finished. The suggestion has been made by several writers that here was an object made to be destroyed—sacrificed—not kept!

What we believe to be its real use, however, is suggested by the practice of the medicine man in many historical tribes who uses a small woven grass or wicker basket or tiny birch-bark canoe under certain circumstances. If one has a disease, or bad luck on a hunt, or a known enemy who might do him damage, he applies to the medicine man who prepares a tiny grass basket or bark canoe into which he ties some figure representing the "spirit" of the disease or of the enemy who may cause trouble, or a small effigy representing the one responsible for the bad luck, and after he "makes medicine" and goes through his incantations, the minature basket or canoe containing the effigy is given to the patient to be by him destroyed. When it is so destroyed, the disease will leave him, the spell of his bad luck be broken, or his enemy rendered powerless to do him injury. It has been suggested that these tiny baskets or bark canoes are the historical replicas of what were boat stones in prehistoric times.

While such an explanation may appear to be highly fanciful and scientifically unproven, yet all the evidence available supports such a theory. Boat-stones are rarely found—because they were made to be destroyed. How could primitive man destroy anything? It is natural to suppose that there were but two ways which would appear to him to be complete, namely, by the use of fire or of water. He could burn up his enemy's image or he could drown it in a stream.

It is an interesting fact that of the very few boat-stones found, many have been discovered on the banks of streams, on sand bars or on islands in the river. When found elsewhere as in fields or on camp sites they show unmistakably that they have been subjected to the action of fire. Again, there has been reported from New England the finding of a number of boat-stones in the gravel of certain of the swiftly flowing rivers of the state of Maine. This gravel was dredged from the river bottom, together with sand and silt, for commercial use. The sand being washed and screened, the gravel was saved for concrete construction work. From an immense pile of such material taken from the Penobscot River, upwards of twenty boat-stones were discovered. This would lend color to the idea that the boat-stone was "destroyed" by being thrown into the river where it has remained uninjured for centuries. Whatever else may be said, the boat-stone remains one of the very interesting problematical forms whose use and cultural association may never certainly be known.

Somewhat more elaborately made is the type of artifact commonly designated a "bow-string sizer." This stone of serpentine, flat on one face and convex on the other, has two cylindrical holes drilled through the thicker portion. These holes are of different sizes. On the flat face of this stone there is a concavity some three-quarters of an inch above the main surface of the body, which projection contains a well worn deep groove extending from one hole to the other.

It is certain that the manufacture of leather strings for the bow, for lacing tents, for making clothing, and for general household use, was an important problem for early man. Skins could be cut into thin strips with comparative ease by the use of flint knives but such cutting must have left them somewhat rough and with more or less of a square cross-section. It has been suggested that this stone was used to work down leather strings by pulling them back and forth through the holes and thus rendering them smooth and of uniform size. While this explanation

may or may not be correct, it is certain that this type of stone artifact is quite rare and in all cases very well made. It is evident that it was a highly prized instrument although today we may not be certain of its use.

The name "bird-stone" is applied to a very numerous class of ancient artifacts of quite a variety of forms, all of which show more or less certainly the shape of a bird. Many of these representations are highly conventionalized and the real likeness to a bird in some cases is not easily discerned. They appear in a variety of materials, banded slate being the most common, while sandstone, granite, porphyry and other stones are also used.

Bird-stones have been the subject of a vast amount of speculation and investigation and many articles have been written concerning their distribution, significance and use. Moorehead has made a very complete study of their occurrence and finds that they are to be expected in New York, Western Pennsylvania, Central Kentucky and Tennessee, and in an area extending northward to include Ohio, Indiana, Michigan and central Canada. In fact their distribution seems to indicate that this form of artifact had its origin in a fairly definite area which included Ohio, Indiana and southern Michigan, and that its use spread from this central area. They are practically unknown outside of the larger area mentioned and as Moorehead has pointed out they tend to illustrate, probably better than any other of the problematical forms, the theory that they may all have spread from a common center of distribution.

Various writers on the subject have attempted to classify bird-stones, closely related to the so-called "bar-amulets" and practically without exception they all have a flat or nearly flat base which is drilled at either end. These drillings are generally characteristic of this type of artifact, each being made by the intersection of two conical holes, one hole drilled from the base and the other from the end or side. It is clear that the purpose of these drillings was that the stem might be attached in an upright position to some flat surface on which the base rested.

The use of the bird-stone is of course entirely conjectural. Some writers have asserted that they were worn on the head by married women to denote pregnancy and were an appeal to

the "Thunder Bird" for protection. Others insist that they were worn by conjurors or medicine men as a badge of office since in later historical times the medicine men still wore as such a badge of office a bird skin dressed and stuffed and mounted over their left ear on their head-dress; this skin is believed to have replaced in historical colonial days the birdstone of prehistoric times.

Some authorities have drawn the conclusion from suggestions of the early missionaries among the Indians that bird-stones were attached to the prows of the canoes used by those who hunted water-fowl on the rivers and streams to bring them good luck. Still others believe that this practice was extended to the use of bird-stones as amulets, to be attached to bows, spears, and even to arrows. From this mass of contradictory theories suggested by various writers it as at least evident that the bird-stones must be placed within the problematical class of artifacts.

Thus far archaeologists have not assigned bird-stones to any distinct culture, yet there seems to be a general agreement that they are among the oldest if not the oldest of all the problematical forms. While bird-stones are not numerous in Kentucky, they are occasionally found. So far as our records show they are plowed up in the open fields and so far as is known they are not found in association with graves or with mound sites.

Closely related to the bird-stone is the "bar amulet." This stone is usually a straight bar, sometimes more or less modified, some four to six inches long, and drilled in a manner quite similar to the bird-stones. They are made of banded slate, brown or black slate or shale, or other similar material. They occur sparingly in Kentucky, sometimes in association with graves, and in as much as they have been found occasionally on the left side of skeletons, it has been suggested that they were worn on the left wrist to prevent the bow string when released from injuring the skin. While this seems a reasonable explanation of their use, yet many bar amulets have been found in such association as to make the theory doubtful. They are in general well made, highly polished and indicate as high a degree of workmanship as the bird-stones.

"L" shaped gorgets usually described as geniculate are rare but occur sparingly over the greater part of central United

States eastward to New York and into Canada. Kentucky has produced a number of specimens, all of which are of highly polished banded slate. In one such form the sides are flat and the cross section of the specimen about square, while the other, a typical modification, has the convex side ground down to a fairly sharp edge as if it was to be used as a knife. It could not, however, have served such a purpose, as the stone is far too soft.

The real purpose of the geniculate form of gorget is wholly unknown its occurrence being so rare and its association so indefinite as to offer little evidence as to its use. The most plausible explanation seems to be that their form represents horns and that they are attached to the head-dress of important personages. Catlin has explained how the Mandans and other tribes of the Northwest accorded the right to wear horns on the head-dress only to the most honored and distinguished chieftains, as a recognition of their high character and prowess in battle. It may be that the geniculate form of artifact was used in prehistoric times as such ornaments on the head-dress of a relatively few persons—hence their rarity.

Two quite rare forms of pendants are of banded slate, flat on one side, polished, dagger-shaped, and with a groove cut in the upper end for suspension. They were probably worn as ornaments and they form a distinct class of problematical forms.

We have encountered a few specimens of the spatulate form of artifacts sometimes called "spuds." These, like many other problematical forms, are comparatively rare. Apparently they are most numerous in the south, although they are found northward to Canada. They are usually found in mounds, and sometimes in graves. Many are made of materials quite soft, such as slate, shale, and even cannel coal, which would seem to preclude all possibility of use as a tool. Others are made of very hard stone such as greenstone and granite as shown in figure 171. There are many forms of the spatulate objects, but the two figured are the most common. The long form with the flared blade is generally without perforation but often has a number of grooves cut on the edge of the blade and sometimes notches cut on the handle. The form with the broad blade and short stem often has a drilling through the stem as shown in the figure.

There is considerable literature relative to the problematical use of these forms. Some have doubted that they are genuine prehistoric artifacts but the exploration of Moore in the south which revealed so many specimens in mounds and graves has set at rest forever any doubt as to their genuineness. Moore found

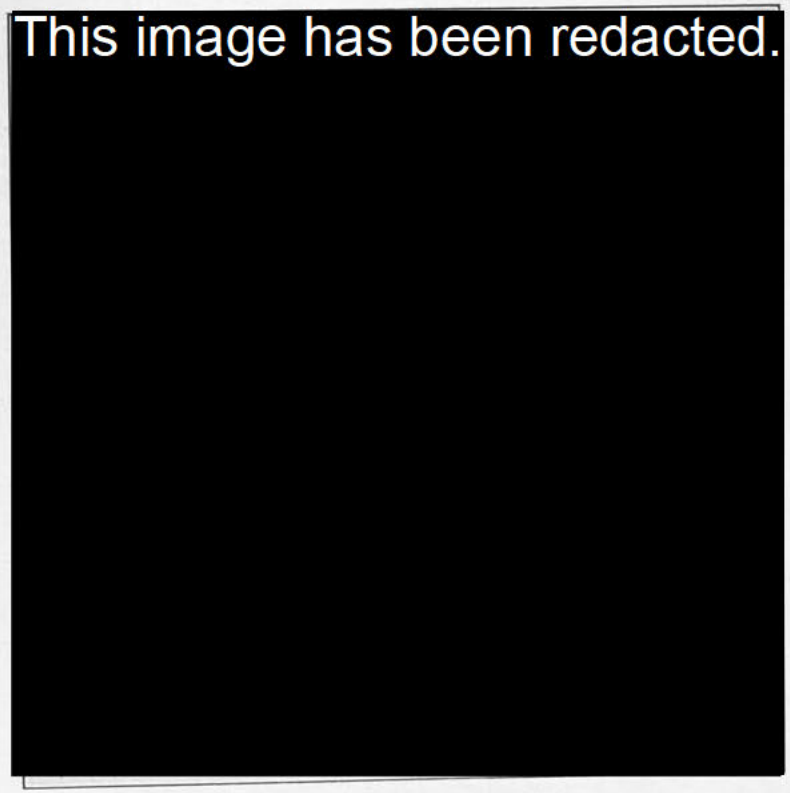


FIG. 171. SPATULATE FORMS.
A rare type of artifact often called a "spud."

specimens that bore evidence of having been used with handles. He therefore regarded them as a form of ax and because of the high character of the workmanship and the lack of evidence that they were used for rough work, he considered them as a form of ceremonial mace.

In fact, most writers agree that probably the larger number of the single specimens found in graves, especially the southern forms, properly belong to the ceremonial class of artifacts, although there seems to be evidence that in the north, especially in Michigan, cruder implements of this form were actually used as spades or axes. There is also evidence that cer-

FIG. 172. MISCELLANEOUS AND PICTOGRAPH FORMS.
Showing three stones engraved with a fish image, a flint hook, two trade pipes of colonial days, a turkey-call of bone and pieces with representations of the human face.

tain of the northern tribes even in early historical times used a "spud" of the long handled variety to remove the bark from trees in the manufacture of canoes.

A rare type of stone artifact, "decorated cylinders," are commonly from two to three inches long and about an inch in diameter. They are made of sandstone and generally have at the center of each end-face a small hole drilled a short distance —perhaps a sixteenth of an inch deep. These cylinders are

decorated over all of the surface with a system of grooves cut of such a size and depth as to leave the surface covered with ridges. A characteristic of the cylinder is that the ridges are not continuous but end abruptly to start again after an angular offset. These cylinders are found in graves and on mound sites but are quite rare. It is believed, however, that they are perhaps more common in Kentucky than in any other area. Their purpose is entirely unknown. In general they are too short to have been handles and they show no evidence of such use.

Early man in Kentucky did very little pictographic writing that has remained to the present time. However, he did in certain cases scratch or cut on stone some curious bird and other animal figures which seem to have no purpose except a crude attempt at drawing. These engravings occur most frequently in village sites along the rivers and the design is generally that of some aquatic form. Figure 172 shows three stones which although engraved in a very crude way are yet unmistakably attempts to represent a fish. A number of such drawings have been found along the Ohio River and are now in the hands of private collectors. Others painted in colors on prominent cliffs and trees in Eastern Kentucky, crudely representing beasts, birds and fish, as described by Dr. Jillson in his "Big Sandy Valley," are now quite obliterated.

Banner-stones and slate gorgets were discussed under the subject of ground stone artifacts and there is a rare form of stone object called the "double-crescent" which may properly belong to such classification but which we are here considering in the miscellaneous group. They are occasionally found in southern Kentucky and Col. Bennett H. Young figured several from this state. One such double crescent is made of banded slate. It measures seven inches in its largest dimension, is quite thin, highly polished, and has the cylindrical drilling in the center common to all banner-stones. This specimen is well made but is not exactly symmetrical. A smaller specimen which is of quartzite is double drilled as if it was to be worn as a gorget.

Of all artifacts made by early man, those that are most subject to decay are naturally among the rarest. This is particularly true of articles of dress made from skins or from

woven fabrics. However, about 1894, Col. Bennett H. Young discovered in some of the caves in the famous cave region of Kentucky, particularly in Salts Cave, much evidence of ancient occupation including articles of dress, wooden implements, woven fabrics in the form of bags, many sandals or slippers and other more or less perishable objects. These articles were carefully preserved by him and later came into the possession of the

FIG. 173. AN ANCIENT SLIPPER.
A sandal of fiber found in Salts Cave.

American Indian Heye Foundation, New York City. In one of the series of monographs published by this Foundation, these discoveries of Col. Young have been discussed by William C. Orchard.

After the recent death of Professor J. C. Norwood of the University of Kentucky, for many years State Inspector of Mines, there were found among his effects other specimens of woven sandals which he had taken from Salts Cave. Figure 173 shows one of these sandals. It is made of the coarse fibrous material of Typha (cattail) which is a native of Kentucky and grows abundantly in the cavernous limestone region. The specimen figured shows very clearly the method of weaving and the special compartment for the great toe, and is very similar to the specimens described by Orchard which came from the same cave. While this sandal shows such use as to have worn

out the sole which probably lead to its being discarded, yet the salts of the cave have so preserved the vegetable fiber that it still retains its form after scores and perhaps hundreds of years.

Much may be learned from a study of such specimens as to the development of the textile art in prehistoric times. Salts Cave alone presents several forms of weave, the fiber from a

FIG. 174. WHET STONES.
Used for sharpening and polishing pointed objects.

number of plants, and specimens of fiber prepared for weaving which had not been used. Such artifacts are necessarily rare archaeologically and could exist today only because cave conditions tend to prevent natural deterioration.

On ancient sites there are two other types of artifacts often found—"whet-stones" and the so-called "paint-cups." The whet-stones shown in figure 174 are from Fox Field and are to be picked up rather commonly on the village site. Many are quite large, too heavy to carry, others small and of convenient form. All are of sandstone and show unmistakably that they were used to sharpen or polish pointed objects.

The paint cups in our collection were taken from graves. They appear to have been hollow limestone concretions which were roughly spherical in form. The user had worked them

down to a smooth surface on the outside, and the inside shows evidence of grinding. They are generally considered to have been small mortars used to grind or mix pigment. On one specimen a groove has been cut for attachment. Whatever their actual use, they were valued as offerings to the dead, the specimens being all taken from graves.

CHAPTER XV

PRE-COLUMBIAN TIMES

During the long period in the ancient history of Kentucky which intervened between Glacial Times and the coming of the white explorer to this region—for we assume that modern history can not properly be said to begin until the first white man appeared upon the scene to record it—many changes took place in the animal life. Probably at least fifteen or twenty thousand years elapsed between the time when the mastodon roamed the country and the days when Daniel Boone watched the buffalo wander over the same territory, and part of this time represents a long hiatus in the known faunal history of the state. During this period the typical Pleistocene animals such as the mastodons, the mammoths and the ancient horses, bears, hyenas and foxes disappeared and in their places by the slow processes of evolution came the bison, elk, panther, and the more recent kinds of wolves, bears, deer, rodents, and birds which were known to the modern Indians and which were found by the first settlers. The ice-masses had receded, the climate had modified, the configuration of the country had become greatly changed by erosion, and altogether conditions approximated in a general way what they are today, or at least what they were before the last few generations of civilized man had denuded the forests, cultivated the soil, killed off the game and destroyed most of the large forms of our wild life.

Therefore the last period of the ancient history of the animals must deal with those forms which were in existence immediately prior to the discovery of America and at a date when the American Indian was in possession of the land which is now Kentucky. Our knowledge of conditions during that period must of course be based on the accounts given by the Indians to the early white settlers, the conditions encountered by the pioneers themselves, the skeletons of the animals which may yet occasionally be found and by the bones which we have described as forming part of the kitchen-middens of early tribes. This information while not nearly as complete as we would desire is never the less probably accurate so far as it goes and gives us

a fairly correct picture of this region while it was yet in its primeval state.

We know that this part of the Mississippi Valley was densely wooded and that apparently all of what is now Kentucky was covered with forests, cane or grass. From time to time that part of the state which occupies a portion of the Southwestern Plateau seems to have been denuded of its timber from some cause or other which we can not certainly explain and reduced to an open plain. It was in such condition at the time of the arrival of the first settlers and by them it was given the name of "The Barrens" since they supposed that the region would not support plant life, an idea which was of course entirely erroneous for it is now well wooded and well suited for agriculture. Various theories have been proposed to account for the absence of timber on this tract at certain times. One theory holds that it was regularly burned over by the Indians; another is that the great herds of buffalo trampled down and ate off the vegetation and kept the saplings from developing; a third is that since this is the region of underground streams and very little surface water, it was subject to droughts and that great forest fires may have burned off the timber leaving a barren area which suggested the name.

The state as a whole, however, may be considered to have been, in the later prehistoric period, a region of great forests and a luxuriant vegetation. It must have been, indeed, well suited for many varieties of animal life and if we are to believe the traditions of the Indians and the tales of the pioneers it was a hunter's paradise, abounding in game of all descriptions. The very physiography of the state makes this probable. The rugged "mountains" were ideally suited to harbor the bear and wild-cat; the broad plains offered a splendid range for the buffalo and the deer; the dense forests provided the lair of the panther and the runway of the elk; the many beautiful rivers provided the habitat for the fish, the otter and the beaver; the caves sheltered the fox and the skunk; the cliffs gave to the buzzard and the eagle the homes which they desired.

It would be hard to find a region in which more varieties of wild life could be maintained than Kentucky a few hundreds of years ago. Undoubtedly a wide variety of life was so maintained but there was no pen to record it and no brush to paint it. Naturally the Indians and the pioneers were interested primarily in those animals which affected very directly their lives and such animals are the only ones they mention. They record the taking of the buffalo, the elk, the deer, the squirrel, the raccoon, the opossum, the wild duck and the wild turkey to provide food for their tables and of the bee which provided their honey; they relate the killing of the bear, the panther and the rattlesnake to protect their lives; they tell of the slaughter of the wolves and the foxes which preyed upon their domestic animals; they used the deer-skin, the buffalo-robe, the bear-skin coat and the coon-skin cap as articles of clothing; their rough cots were softened by pelts of beaver and bear and buffalo and deer. All of these had a real economic value and were for that reason known and recorded. But of the multitude of other animals which must have been all about them, we find hardly a mention.

Among the animals which we know were in this region during the period about which we are now writing, there are a few which deserve special mention chiefly because of the fact that most of them are now extinct or are no longer found in Kentucky.

The American bison, known to the early settlers as the "buffalo" should come first on such a list. That it ranged Kentucky in enormous numbers can not be doubted and even experienced hunters such as Daniel Boone and Simon Kenton were "amazed" at the immense herds which they saw. The fate of this magnificant beast in the United States is one of the great tragedies of North American animal life.

The elk, which is really the wapiti and closely related to the famous stag of Europe, was another of the noblest of the animals which provided meat and leather for the Indians and the pioneers. It was generally regarded as *par excellence* the game animal of the United States.

The deer must have been very plentiful during the period of which we speak and persisted longer than most of the other wild animals. In fact, there are still a few wild deer in the state. We have already noted the fact that it was probably the commonest form of animal food for prehistoric man.

The panther, the largest of the North American cats, was much feared by the Indians and by the first settlers. Although it was a cowardly beast and although many of the blood-curdling stories concerning it were probably greatly exaggerated, it was large and powerful with dangerous teeth and claws and its stealthy habits made it a beast to be dreaded.

The wild-cat is still to be found in Kentucky and was once very abundant. Like the panther its nocturnal life and blood-thirsty habits made it a terror of the forests.

The bear, which is also still occasionally found in the state, was likewise very common in early days. Even after the coming of the white man it proved itself no mean antagonist of the pioneer hunter who was dependant on the old "muzzle-loader" and the sheath-knife for weapons. The size, strength and endurance of this animal, and its speed in action despite its apparent clumsiness and lumbering gait, made it a savage foe and enabled it to hold its own against its enemies.

The wolf was apparently not greatly feared by the Indians nor the white man and is generally spoken of by both in terms of disdain—"cowardly, skulking beasts"—which lived in the timber and preyed on weaker animals.

Two foxes, the red and the gray, were abundant in Kentucky at this time and both are still to be found in considerable numbers in the state. The Indians knew them well and often referred to them.

The beaver was also well known to the Kentucky Indians who greatly admired its industry and patience. Its fur was excellent and its skin served as currency.

The rattlesnake and copperhead were common in the uplands and the cotton-mouth moccasin was found along the southern streams and in the Reel-foot Lake region. Doubtless many other snakes were abundant but since they were harmless they were unnoticed or at least unrecorded.

The wild-turkey and the grouse were the outstanding game birds of early days and are closely associated with the pioneers. Unfortunately both of these birds are now very rare in Kentucky and in fact are probably doomed to extinction in the near future.

One of the greatest tragedies in the bird world has been the extinction of the passenger pigeon or "wild pigeon" of the

Indian and early residents of the state. At one time this was probably the most abundant bird in Kentucky but now so far as we know there is not a living specimen on earth. It is hard to believe the stories, which are undoubtedly true, told by Audubon and Wilson of the multitudes of these birds which roosted and fed in Kentucky even as late as their times—how they flew overhead in such vast numbers as to darken the sun for hours at a time; how the weight of their bodies broke down the timber in their roosting places; how their dung fell like snow flakes and covered the ground for a depth of several inches in their nesting-sites. The Indians knew these birds well and they were doubtless here in countless thousands before the coming of the white man.

All the above animals are now getting scarce if they are not already extinct and perhaps in another generation or two we shall know them no more. It is most unfortunate that the slaughter of our wild life goes on so ruthlessly and that we can already foresee the end of so many of our most valuable species.

In addition to the above, there were of course present in the period which we are discussing most of the other wild animals which are still with us—the raccoon, the skunk, the opossum, the native rodents, our wild birds and our fish—which had appeared long before this period and were doubtless very numerous. Also the host of smaller animals—the protozoans, worms, molluscs, insects and the rest of the invertebrates—which are not mentioned and in many cases were perhaps not even known by early man. Of the higher forms of animal life, we have now in Kentucky probably 150 species of fish, twenty-five or thirty amphibians, ten turtles, six lizards, twenty-five different kinds of snakes, about 275 species of birds and about forty-five mammals. We assume that all of these were present just before the historic period began and doubtless most of them were far more abundant than they are now.

These, however, are not the groups in which the zoologist is most interested. Our present interests center around the lower forms of great economic importance, such as the insects, the worms, and the protozoans, particularly those which threaten man's existence. It is unfortunate that we have small means of knowing which of these were present and abundant in

late prehistoric times, but of course in this field of research our data are very limited.

We can only suppose that the animal life in this period was abundant and varied; that our present animals were then in existence in large numbers and that many forms which are now extinct were in those days in the height of their ascendency. And this condition pertained until the first white man arrived and brought the ancient history of Kentucky to a close.

The human inhabitants of Kentucky in pre-Columbian days were of course the American Indians of whom various tribes are known to have been in this state at different times. As to the origin and ancestry of these tribes we know little. They may or may not have been the descendents of some of the prehistoric groups which we have discussed; they may or may not represent a distinct ethnological race; they may have been the culmination of a more primitive culture or they may illustrate a stage in the decline of a higher type of civilization. But whoever they were, whatever their origin, whatever their ancestry or whatever milepost they had reached on the great highway of human evolution, they were here when the first European reached the borders of that wonderful wilderness which "was called Kentucke."

The subject of the American Indian is of course entirely too pretentious to be discussed in this brief report. It forms a great and fascinating part of the literature of early American history and has furnished the material for many voluminous and scholarly dissertations. Despite the research which has been done on the subject, however, it is still appreciated far too little by the average student and is sadly neglected in most of the histories of our country. If the average student in school or college is asked regarding any of the important tribes—the Shawnee, the Cherokee, the Blackfeet, the Cheyenne, the Choctaws, the Chickasaws, the Seminoles, the Creeks, the Utes, the Piutes, the Hopi, the Navahoe, the Winnebago, the Omaha, the Osages, the Crow, the Iowa, the Cree, the Delawares, the Mohicans, the Kickapoos, the Miami, the Mohawks or the Hurons —he usually has only the vaguest of ideas; if he is asked to tell something of the habitat of such tribes or their tribal customs or methods of living, he generally admits entire ignorance.

To many persons "an Indian is an Indian;" he is vaguely visualized as a "savage" or a "redskin;" he is dismissed with a gesture that we may egotistically devote our attention to the achievements of the invading European. And yet the subject represents one of the most interesting phases of American history. Not that the Indian should be considered as a hero, or a martyr, or a superman, or the noble representative of a wonderful race—he was probably none of these. Doubtless most of the tales which portray him as a splendid figure in romantic settings, as a marvelous athlete of unequalled prowess, or as a crafty statesman of inscrutible mein, are greatly exaggerated, but nevertheless, as a representative of a race of great ethonological importance, the American Indian is deserving of our most careful study.

It is a mistake, of course, to think of all of the American Indians as belonging to a common, closely related group as is so often suggested by careless historians. To be sure, the different tribes lived upon the same continent, but so do many peoples in Europe who are far removed in origin and ancestry. Such important Indian stocks as the Iroquois, the Muskoki, the Catawbas, the Algonquin, the Sioux, the Pawnee, the Yuma, the Pueblo and the Athabascan may indeed represent very different origins as they certainly represent different linguistic, cultural and religious development.

The problem presented to the archaeologist and ethnologist by the various stocks and the subdivisions of these stocks into tribes is a most difficult one and may never be solved. Indeed, in the absence of written records it bids fair to prove unsolvable. Such meager information as is furnished by some of the supposed original records as, for example, the famous Walum Olum or "painted sticks" record which is thought by some to be the history of the Lanapes as complied by a Tallegwi slave or captive seems to add to the confusion rather than to throw light on the subject.

Never the less we must recognize that at the time of the first recorded visits of the white man to America there was on this continent a considerable population of human beings living over a wide area and representing a long occupancy. They were hunters and trappers, they were agriculturists and artisans,

they were boatmen and fishermen, they were warriors and travelers, and in many cases they had wandered far from former lodges. Most important of all from the standpoint of the historian, they had kept no record of their wanderings save that most unreliable of all records—traditions handed down from generation to generation by word of mouth.

We know fairly well what tribes were in Kentucky in comparatively recent times but on the whole this territory seems to have been a "no man's land" so far as permanent occupancy by any one tribe in immediate pre-colonial days was concerned. Apparently the region which is now Kentucky was a favorite hunting ground for a number of tribes and was jealously guarded by all of them against any who might desire to claim it as their own. In earlier days prehistoric man had undoubtedly lived here either in large numbers or for a long time—but not the more recent American Indian. He came upon the scene later and found it to his liking. It was rich in game and easy of access; it was beautiful in appearance and salubrious in climate; it contained few lodges of his enemies and was apparently favored of the Great Spirit; and so he guided his canoe along its peaceful streams and wandered through its forest trails.

And so his happy life continued until one eventful day—exactly when and where we can not be sure—he met a stranger on his path, a stranger very different from any that he had ever heard of before—a white man! Gabriel Arthur, a young Virginian, has been shown to have been the first man of European descent and undoubted record to have crossed the boundary of this Commonwealth his entry having been made in 1674 as an Indian captive. But others had surely preceeded him though they left naught to tell of their exploration in the great wilderness. As their voices resounded through virgin forest and stream-bound meadow, the ancient history of Kentucky ended and modern history began.

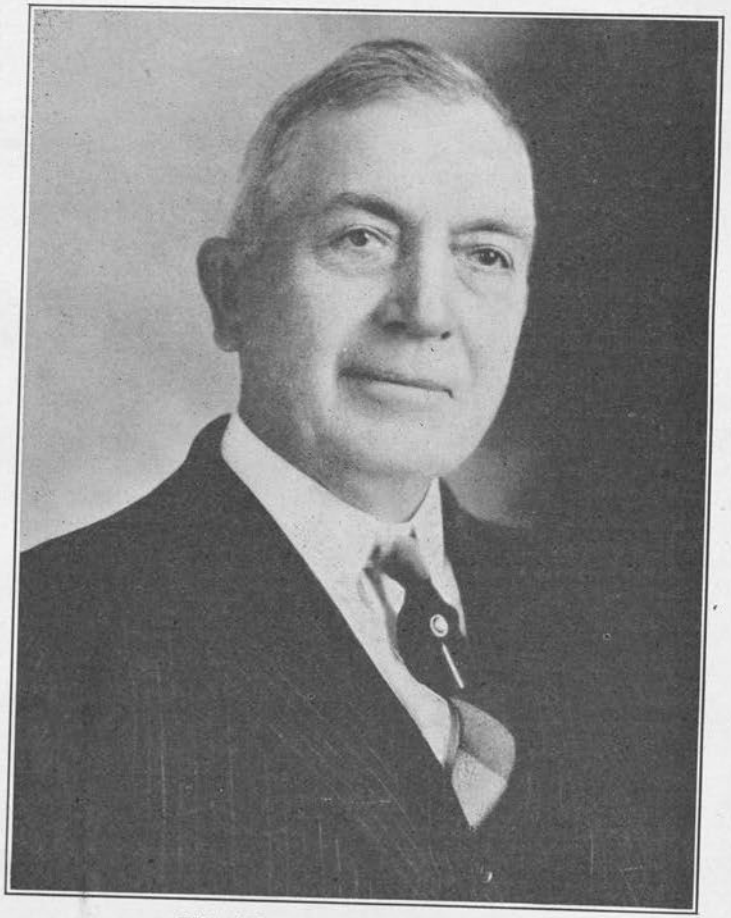


FIG. 175. WILLIAM J. CURTIS.
An enthusiastic collector of prehistoric artifacts who has been of great assistance to the authors in their field investigation in Kentucky.

CHAPTER XVI

ARCHAEOLOGICAL SURVEY

In the following list of aboriginal sites in Kentucky, many which were taken from the reports of older authors such as Collins and Rafinesque may by this time have been destroyed or obliterated. They are included here as a record of those aboriginal works which existed in by-gone days. Such a record, also, may tend to the preservation of some which are still recognizable and to the possible discovery of others which have never been located since their original mention.

Many of the other sites here recorded have not been visited by the authors of this report and are included entirely on the authority of others whose names are given in the respective instances.

This list doubtless represents but a small number of the ancient sites which exist in the state. Hundreds, perhaps thousands, of others may be found and if this brief enumeration serves as a challenge to others to definitely locate and describe the graves, mounds, forts and other evidences of prehistoric people which have not been brought to our notice, it will have served one of the purposes for which it is written. There are many portions of Kentucky which have received but slight attention from an archaeological stand point. Since prehistoric man roved over the entire state of Kentucky, it may be found that many really important locations have been over-looked.

As the list will indicate, we are indebted to many interested persons throughout the state for certain of these records and we have attempted to properly credit each in connection with the mention of the record. One to whom we are particularly indebted is the Honorable William J. Curtis of Piqua, Kentucky, who has for many years been an ardent collector of archaeological material and who has not only directed us to many of the sites which otherwise we might never have located, but has on many occasions assisted us with the excavations.

To facilitate reference, the records are given by counties as follows:

ALLEN COUNTY

1. Mound containing a well-like vault ten feet deep and eight feet in diameter walled up with stone and with a bottom made of flat stones placed on edge close together and keyed in with smaller stones. At every two feet in this vault was a layer of large flat stones and between these were skeletons. Examined by R. B. Evans and described by Bennett Young, but exact location not given.

ANDERSON COUNTY

1. Mound on Montrose Farm of Davis Brown. about six miles from Lawrenceburg on the Bond's Mill Road. Mound is about ¾ miles below Bond's Mill Dam on Salt River; it is 400 ft. long, 300 ft. wide and 20-25 ft. high. Top is nearly flat and is cultivated. Surrounded by trees and shrubs. Surface is strewn with artifacts and worked flint. Visited by T. M. Hahn and Dr. G. B. Claxon of Lawrenceburg who found several arrow-heads on the surface. Investigated by W. S. Webb and W. D. Funkhouser, August 2, 1924. Top was in corn so that no digging could be done. Superficial examination of surface yielded a few arrows and knives, two "turtle-backs" one or two crude sandstone artifacts and a large number of worked flint pieces.
2. Cave on property of M. C. McBrayer about 2½ miles from Lawrenceburg on the Clifton Pike. Described in this report.
3. McCall's Spring. About five miles south of Lawrenceburg on the property of Dr. J. B. Lyen. Close to the pike and is now protected by a wall. It is often mentioned in early writings and is known as the "Treaty Spring." Many artifacts have been found in the neighborhood. Undoubtedly used by aborigines. Visited by W. S. Webb and W. D. Funkhouser, August 2, 1924.
4. Mound or mound-like earthworks on farm of John Dawson just off the Clifton-Lawrenceburg Pike about four miles from Clifton. Mound is about 75 yards wide, 150 yards long and 30 feet high with a spring at the foot. Artifacts discovered on surface but no excavation made. Reported by T. M. Hahn and examined by W. S. Webb and W. D. Funkhouser.

BALLARD COUNTY

1. A town-site and fort on the Mississippi River one mile from Putney's Bend. Mentioned by Rafinesque.
2. An old fort on Sandy Creek. Mentioned by Rafinesque but not definitely located.

3. Two mounds about ¾ mile from Holloway on the property of J. R. Terrell almost opposite Mound City, Illinois. One mound is 173 feet in diameter and 24½ feet high; the other 172 feet in diameter and 15 feet high; both flat on top. Only one burial was found. Apparently not a true burial mound. Mentioned by Collins, reported by C. B. Moore and described by M. G. Miller and S. G. Weir.
4. Three mounds about 1½ miles from the lower end of Island No. 1 and about six miles from Bardwell, on the property of J. W. Turk. These mounds seem to have once been connected by a causeway. The mounds are respectively six, eleven and thirteen feet in height. One skeleton was found, extended on back, several implements, a water bottle and much debris. Mentioned by Collins, located by C. B. Moore and described by M. G. Miller and S. G. Weir.
5. Two mounds of clay, the larger 62 feet across base and 6 feet 3 inches high. Located one mile east of the head of Island No. 1, on the property of J. P. Edwards. Under one mound was one grave in a pit but the pit was full of moisture which had probably destroyed contents. A few fragments of flint and one very fine celt were found near mounds. Recorded by C. B. Moore and described by M. G. Miller and S. G. Weir.
6. Mound 1½ miles northwest of Gage. Reported by W. J. Ashbrook.
7. Mound on the Vernon Randolph farm northeast of Gage. A tomahawk was found in this mound. Reported by W. J. Ashbrook.
8. Mound on the Utterback place, owned by Bill Elliston on the Upper Bardville-Blanville Road, 1½ miles southwest of McGee Spring. Reported by W. J. Ashbrook.
9. Mound on George Mantle farm about a mile from No. 8. Reported by W. J. Ashbrook.

BARREN COUNTY

1. Mound at the mouth of Peters' Creek on the Big Barren River. Mentioned by Collins, but not described.
2. Mound five miles southwest of Glasgow on Skeggs Creek. Mentioned by Collins but not described.
3. Cave on farm of J. D. Smith near Dry Fork. At the entrance to this cave Mr. Smith is reported to have found six skeletons buried in ashes and made dirt. Beads, shells and ornaments were found with the skeletons.

BATH COUNTY

1. Mound ½ mile north of Sharpsburg. Mentioned by Collins but not described.

2. Mound four miles northwest of Sharpsburg, about 1½ miles from Bethel, on a creek west of Bethel. Mentioned by Collins but not described.

BELL COUNTY

1. Many mounds. Mentioned by Rafinesque but not located.
2. Rock shelter just outside of Pineville. Described in this report.

BOONE COUNTY

1. Fort on Sinking River. Mentioned by Rafinesque, but not definitely located.
2. Graves under the town of Petersburg. Mentioned by Collins but not described.

BOURBON COUNTY

1. Fort 1¼ miles from Paris at junction of Flat Run and Stoner Creek. Mentioned by Rafinesque and located and examined by W. S. Webb, Victor Dodge, A. M. Miller and W. D. Funkhouser. Only a few stones remain to mark this site, but there are many indications of early habitation of the locality.
2. Mound six miles north of Paris on Kingston Fork. Mentioned by Rafinesque and examined by W. S. Webb, Victor Dodge and W. D. Funkhouser. This mound had been partly excavated by the students of the Paris High School who had found nothing in it. The authors continued the excavation further and found one human femur but nothing else.
3. Cave on farm of Charles Layson about 2½ miles from Millersburg on the Carlisle Pike. Shows evidence of having been inhabited. Reported by L. J. Clark.

BOYLE COUNTY

1. Two large mounds on property of Silas Mason on Shakertown-Danville Pike about 3½ miles from Danville and three miles from the Burgin Pike. Mounds are located between the pike and Harrington Lake. Now covered largely with second growth locust trees and with many rocks on the surface, some of which have probably been carried there recently from the neighboring fields. No excavation made. A large number of very fine artifacts have been found in the surrounding fields which are now cultivated. Examined superficially by W. D. Funkhouser and F. H. Engelken.
2. Mound 1¾ miles north of Perryville and ¼ mile from the county line on a tributary of Doctor's Fork of Chaplin Creek. Recorded by J. B. Hoeing.

3. Two mounds in northeast corner of county, one-eighth mile from Dix River and one-eighth mile from county line. Recorded by J. B. Hoeing.
4. Mound 1¾ miles north of Danville and ¼ mile west of Southern Railroad tracks. Recorded by J. B. Hoeing.
5. Mound on Salt River 3½ miles from Nevada and about ¼ mile east of the Nevada-Danville Pike. Recorded by J. B. Hoeing.
6. Mound 3¾ miles from Danville on the Danville-Bryantsville Pike, about ¼ mile south of the road and ¼ mile from Dix River. Recorded by J. B. Hoeing.
7. Mound 4½ miles from Danville on the Danville-Nevada Pike, about a mile from No. 5 and ¼ mile from the road. Recorded by J. B. Hoeing.
8. Mound on Scrub Grass Branch, in southwestern corner of the county, one-eighth mile from southern and ½ mile from western boundary of the county. Recorded by J. B. Hoeing.

BRACKEN COUNTY

1. Battle-ground near Augusta. Mentioned by Rafinesque, but not definitely located.
2. The town of Augusta is believed to have been built on the site of an ancient cemetery. When excavations were made for the Ford Garage in 1924, four skeletons were found with shell and bone beads and bone awls. Reported by W. J. Curtis.

BREATHITT COUNTY

1. Large mound in village of Quicksand, on property of Miles Back. Situated on a high elevation overlooking the river. Has been partly excavated. Many artifacts found in the neighborhood. Visited by W. D. Funkhouser. Mentioned in this report.
2. Village site near Quicksand, about three miles up from the mouth of Quicksand Creek on the property of Sanford Brown. Many graves and a great deal of surface material, particularly arrows, scalers and game-stones. On this site a circular depression was according to tradition used by modern Indians as a race-track for their ponies. Visited by W. D. Funkhouser.
3. Observation mound on a cliff above Big Branch of Quicksand Creek, about two miles from the mouth of this branch. Described in this report.

BRECKINRIDGE COUNTY

1. Prehistoric grave in Cloverport. Mentioned by Collins.

BUTLER COUNTY

1. Mound on the Martin Place on Green River, ten miles west of the mouth of Barren River. Mound is quadrilateral, about 115 feet by 90 feet and five feet in height, the summit being flat and about 60 feet square. Large number of stone graves made uniformly and placed at right angles to each other in the shape of an "L". The graves were floored with slabs of rock. Located, examined and described by M. G. Miller.
2. Mound on the Annis Place on the Green River, mentioned in this report. Very large, 110 feet in diameter and 11 feet high. Evidently domiciliary as no graves were found. Located and recorded by C. B. Moore; more carefully examined and described by M. G. Miller and S. G. Weir.
3. Mound on E. A. Cherry Place about one mile east of the mouth of Barren River. Mound is 32 feet long, 22 feet wide and 3½ feet high and contains a large number of stones. Apparently a burial mound. Located and recorded by C. B. Moore; examined by M. G. Miller.
4. Mound on G. M. Taylor Place on the Green River, 2½ miles east of the Cherry mound. Mound is 21 feet in diameter and contained a grave 7 feet 10 inches long and 3 feet 5 inches wide built of slabs of sandstone and limestone. Grave had been disturbed and contained only a few fragments of human bones. Located and recorded by C. B. Moore; examined by M. G. Miller.
5. The DeWeese mound on the Green River. Described in this report.
6. Mound near Little Reedy Point. Recorded by C. B. Moore.

CALDWELL COUNTY

1. Stone fort on Tradewater River. Mentioned by Rafinesque but not definitely located.
2. Old fort near the west fork of Donaldson Creek. Mentioned by Rafinesque; described and figured by Bennett Young.
3. Caches of artifacts found two miles from Princeton. Recorded by Rafinesque.

CALLOWAY COUNTY

1. Many mounds and graves on the Blood River. Mentioned by Rafinesque but not definitely located.

CAMPBELL COUNTY

1. Big Bone Lick. Described in this report.
2. Stone graves four miles above Newport on the Ohio River. Located, examined and described by Bennett Young.

CARLISLE COUNTY

1. Mound within the city limits of Bardwell. Contained bones, flints, deformed skulls and pottery. Examined and reported by G. D. Baucom.
2. Mound about 2½ miles northeast of Milburn. Many artifacts have been found in neighboring fields. Has not been excavated. Reported by G. E. Stone.
3. Mound 4½ miles northeast of Bardwell in edge of Mayfield Creek Bottom. Reported by W. J. Ashbrook.

CARROLL COUNTY

1. An ancient fort ¼ mile from the bank of the Ohio River. Mentioned by Rafinesque but not located.
2. A campsite near mineral spring just outside the city of Carrollton. Surface artifacts and flint spalls still numerous. Visited by W. D. Funkhouser.
3. Fort on the Ohio River 2½ miles from the mouth of the Kentucky River. Mentioned by Collins.

CASEY COUNTY

1. Mound which has never been excavated on the Moore farm five miles up Brush Creek from Liberty. Reported by W. P. Price.

CHRISTIAN COUNTY

1. Many graves and a village site on Little River. Mentioned by Rafinesque but not definitely located.
2. Mound ten miles east of Hopkinsville, 30 feet in diameter and six feet high. Two burials, an adult and a child, the former in a rough stone cyst. Mentioned by Rafinesque; described by Bennett Young.
3. Mounds on Buffalo Creek four miles from Raleigh. Mentioned by Rafinesque.
4. Mounds on Lost Creek. Mentioned by Rafinesque but not located.
5. Many graves near Hopkinsville. Mentioned by Rafinesque but not definitely located.
6. Stone graves on Glover Farm near Trenton. Described in this report.
7. Mound on Glover Farm. Described in this report.
8. Racetrack on Glover Farm. Mentioned in this report.

CLARK COUNTY

1. Mound 12 miles due east of Winchester. Recorded by Rafinesque but not described.

2. Indian Fields. A village on the site of an Indian village from which it derives its name. It was occupied by the Shawnee in rather recent times.
3. Several stone graves on the "Devil's Backbone." Mentioned by Rafinesque but not definitely located.
4. Mounds on the farm of Jacob Gray on the railroad near Winchester.
5. Several mounds on the farms of Jim Powell and John B. Pirtle.
6. Several rock graves on a hill on the farm of J. A. Stevens about one-half mile from Greenville.

CLAY COUNTY

1. Many mounds and graves near Manchester. Mentioned by Rafinesque but not definitely located.
2. A burial ground near Salt Lick. Mentioned by Rafinesque.

EDMONSON COUNTY

1. Mammoth Cave. Described in this report.
2. Salts Cave. Described in this report.
3. Sand Cave. Described in this report.
4. Lynn Cave. Described in this report.
5. Bratcher Rock Shelters. Described in this report.
6. Mound on Green River one mile from Brownsville. Mentioned by Collins but not described.

FAYETTE COUNTY

1. Earthworks on South Fork of Elkhorn. Described in this report.
2. Fort 6½ miles from Lexington on Newtown Pike. Mentioned by Collins.
3. Breck Smith Cave. Described in this report.
4. Phelps Cave. Described in this report.
5. Russell Cave. On property of L. L. Haggin on the Russell Cave Pike. Reputed to have been used by aborigines and to have yielded many artifacts. In recent years the stream flowing through it has been dammed and it is now largely filled with water.
6. Graves on bluff of north bank at mouth of Boone's Creek. Mentioned as "Indian Graves" in old deed to this property. A few stones still remain to mark the spot. Rather extensive digging yielded nothing. Examined by J. H. Staples and W. D. Funkhouser.
7. Ancient fortification on the Christian farm, the second farm on the Liberty Pike off the Winchester Pike. Reported by F. H. Engelken.

FRANKLIN COUNTY

1. Cache of artifacts found. Recorded by Rafinesque but no exact location given.

FULTON COUNTY

1. Bayou du Chien fort. Described in this report.
2. Bayou du Chien mound. Described in this report.
3. Campbell Mound. Six miles east of Hickman on the property of T. M. French. Quadrilateral, 225 feet by 160 feet at base, 18 feet high. Remains of a causeway on one side. Mound proper has not been excavated but a burial nearby indicated that the body had been cremated and placed in a pottery vessel. Recorded by C. B. Moore; examined and described by M. G. Miller and S. G. Weir.

GALLATIN COUNTY

1. Mounds near the mouth of the Kentucky River. Mentioned by Rafinesque but not definitely located.
2. Two mounds near the Ohio River just east of Warsaw. Described and figured by Bennett Young.

GARRARD COUNTY

1. Mound 1½ miles from Camp Nelson, three-eighths miles from the Camp Nelson-Bryantsville Pike, ¼ mile from the Kentucky River. Recorded by J. B. Hoeing.
2. Mound one mile from Buena Vista, ¼ mile north of the Buena Vista-Burgin Pike, ½ mile from Dix River. Recorded by J. B. Hoeing.
3. Mound ¾ mile from Paint Lick on Paint Lick Creek. Mentioned by Rafinesque and located by J. B. Hoeing but not described.
4. Mound on Brown's Branch of Paint Lick Creek three-eighths mile north of Lowell. Mentioned by Rafinesque and located by J. B. Hoeing.
5. Mound on Henderson's Branch of Paint Lick Creek, one and three-eighths miles from Lowell just off the Lowell-Lancaster Pike. Mentioned by Rafinesque and located by J. B. Hoeing.
6. Mounds three-eighths of a mile from Taylor's Creek and near Drake's Creek, 3¾ miles from Lancaster and one and one-eighth miles from the county line. A cluster of four mounds. Recorded by J. B. Hoeing.
7. Mound on a small tributary of White Lick Creek, 1¼ miles from Lowell and one mile from White Lick Creek. Recorded by J. B. Hoeing.
8. Mound about ½ mile due south of No. 7 and situated on another small stream emptying into White Lick Creek about five-eighths mile up from White Lick Creek. Recorded by J. B. Hoeing.

9. Mound just across the Creek from No. 8. Recorded by J. B. Heoing.
10. Mound on another small tributary of White Lick Creek about 1¾ miles east of No. 7 and 2½ miles southeast of Lowell. Recorded by J. B. Hoeing.
11. Boone's Cave on Dix River. Described in this report.

GREEN COUNTY

1. Fort and mound on Pittman Creek, 2½ miles from Greensburg. Mentioned by Collins.

GREENUP COUNTY

1. Burial Field at Fullerton. Described in this report.
2. "Old Fort Earthworks." Described and figured by Collins; mentioned and figure reproduced by Bennett Young; discussed in this report.
3. Effigy mound representing a bear near the Old Fort Earthworks. Reported and described by T. H. Lewis; discussed by Bennett Young.
4. A mound and an old fort. Mentioned by Rafinesque but not located. May be same as No. 2.

HANCOCK COUNTY

1. Cache of artifacts found. Recorded by Rafinesque but definite location not given.
2. Cave five miles from Fordsville which has yielded many artifacts, some of which are now in possession of John Smith of Fordsville. Reported by G. W. Ray.

HARLAN COUNTY

1. Mounds near the source of the Cumberland River. Mentioned by Rafinesque but exact location not given.
2. Rockhouse at Pine Mountain Settlement School. An overhanging rock shelter not more than twenty-five feet deep. On Greasy Creek, a tributary of the Middle Fork of the Kentucky River where it heads up against Pine Mountain. Region is rich in flint artifacts. Slope to creek apparently a workshop for flint-makers. Four complete skeletons, one with a greatly deformed skull. Many artifacts and a few animal bones with the skeletons. Examined by A. M. Miller, Victor Dodge and W. D. Funkhouser.
3. Large cave on the north side of Pine Mountain near Poor Fork. Very extensive and contained troughs hewn from logs which contained saltpeter and clay. Explored and reported by Maries Cornett and Macy Taylor, Girl Scouts of Benham, Kentucky.

HARRISON COUNTY

1. Many mounds near Cynthiana. Mentioned by Rafinesque but not definitely located.

HART COUNTY

1. "The Castle." Described in this report.
2. Saltpeter Cave. Described in this report.
3. Rock shelters in cliffs south of Dog Creek. Described in this report.

HENDERSON COUNTY

1. Mound on the Anderson Farm about 14 miles southwest of Henderson and situated on the bank of the Ohio River directly opposite Diamond Island in "Indian Valley." A cluster of four mounds so arranged that they are known locally as the "double headed" mound. From these mounds have been taken many artifacts, bones and other objects, including a lump of lead three inches square. Reported and described by R. Bigler.
2. Several mounds on the Major Farm about 2 miles from Henderson on the Evansville Road. A very large number of artifacts have been taken from these mounds and it is said that three skeletons were found each with a pipe in its mouth. Recorded by Miss Sue Towles.
3. Mound on the farm of Mrs. George Klauder about 4 miles southwest of Henderson. Mound is large and conical about 20 feet high with the farm house built upon its summit. It has never been excavated but many artifacts and bones have been found on and around it. Reported and described by H. Klauder and C. R. Bigler.
4. Mound about ½ mile above Bluff City, between the highway and the bluff. Consists of black soil and was undoubtedly an aboriginal dwelling site and burial ground. In this mound were found seventeen burials exclusive of scattered bones. Eleven of these skeletons were those of adults, two were adolescents and four were children. None of the graves were more than three feet below the surface. All of the bodies were flexed except one. Two crude flint instruments were in each grave and other artifacts were scattered through the mound, including a sandstone ax and two piercing instruments of bone. Described by M. G. Miller and S. G. Weir and mentioned by C. B. Moore.
5. Grave in the city of Henderson at the foot of Sixth St. Found by workmen who were excavating for the foundation of a warehouse. Many arrows and other artifacts were found in this grave. Reported by L. O. Draper.
6. Grave in the city of Henderson between Third and Fourth Sts. Found by boys who were digging a cave. Grave contained a con-

siderable number of artifacts, most of which were not saved. Reported by L. O. Draper.

HICKMAN COUNTY

1. Mounds on the Mississippi River below Ironbanks. Mentioned by Rafinesque.
2. O'Byam's Fort. Described in this report.

HOPKINS COUNTY

1. An old fort four miles from Madisonville. Mentioned by Rafinesque.
2. Graves two miles from Hanson on the Olive Branch Road (the old stage line from Henderson to Madisonville). Recorded by Bennett Young.

JEFFERSON COUNTY

1. Burial ground six miles from Louisville on the Bardstown Pike. Described by Bennett Young.
2. Artifacts found in the city of Louisville at the corner of 31st St. and Portland Canal. Described by Bennett Young.
3. Cache of artifacts found in the city of Louisville opposite Sand Island. Mentioned by Rafinesque and described by Bennett Young.
4. Cache of artifacts found in the city of Louisville at High and 26th Sts. Described by Bennett Young.

JESSAMINE COUNTY

1. Mounds, graves and forts. Mentioned by Rafinesque but location not given.
2. Cave on Windover Farm, one mile north of Nicholasville on the Lexington Pike. Reported to have been used by aborigines. Cave has stone floor and considerable water flows through it. No evidences at present of animal or human occupation. Examined March 27, 1923, by A. M. Miller and W. D. Funkhouser.
3. Cave on farm of S. C. Barkley, 12 miles from Lexington on the Harrodsburg Pike. Opening exposed by falling tree. No animal nor human remains were found. Investigated and reported by W. D. Johnson.
4. Graves near Keene, six miles north of Nicholasville. Described by Bennett Young.
5. Glass Cave. Near Wilmore. Rock floors and sides with many shelves. Long, low entrance. Few evidences of ancient occupation. Examined by A. S. Hendrick, A. M. Miller, W. Lowry and W. D. Funkhouser.
6. Cave on the Kentucky River about ½ mile west of Camp Nelson. One of the many "Boone's Caves." Yielded a considerable number of human bones and some fragments of pottery but extensive trenching showed no graves. Examined by W. S. Webb, A. S. Hendrick, W. D. Valleau and A. M. Miller.

JOHNSON COUNTY

1. A group of five mounds cited by Jillson in his History of the Big Sandy Valley as located above the mouth of Paint Creek in the bottom of the Levisa Fork.
2. Indian camp sites described by M. Hall in unpublished historical manuscript of Johnson County.

KNOX COUNTY

1. Mounds on the bank of the Cumberland River near Barbourville. Mentioned by Rafinesque but no definite location given.

LARUE COUNTY

1. Stone fort six miles east of Hodgensville on the south side of Rolling Fork River. Mentioned by Collins and described by Bennett Young.

LEWIS COUNTY

1. Mounds on the Ohio River. Mentioned by Rafinesque but no definite location given.

LINCOLN COUNTY

1. Mound one mile from Stanford and one-eighth mile east of the Stanford-Danville Pike. Recorded by J. B. Hoeing.
2. Mound one and five-eighths miles from Milledgeville on the Milledgeville-Turnersville road just where the turn is made to Turnersville off the Stanford road. Recorded by J. B. Hoeing.
3. Two mounds 3½ miles from Moreland and about ¼ mile east of the Southern Railway tracks. Recorded by J. B. Hoeing.
4. Two mounds 2¼ miles southwest of Hustonville on Carpenter Creek. Recorded by J. B. Hoeing.
5. Mound on property of James E. Gooch on Goshen Pike about five miles from Stanford. Reported by John Holtzclaw.
6. Mound near Crab Orchard Springs from which was taken a shell ornament engraved with a double-headed eagle. Mentioned by Bennett Young but exact locality not given.

LIVINGSTON COUNTY

1. Many mounds on Hurricane Creek near the mouth of the Cumberland River. Mentioned by Rafinesque.
2. Cache of artifacts found. Recorded by Rafinesque but no definite location given.

LOGAN COUNTY

1. Many mounds and the remains of a prehistoric town on Muddy River. Mentioned by Rafinesque but not definitely located.

McCRACKEN COUNTY

1. Many mounds on the Mississippi River. Mentioned by Rafinesque but no definite location given for any of them.
2. Site of an ancient town on the Ohio River. Mentioned by Rafinesque but not definitely located.
3. Many mounds around Paducah. Mentioned by Rafinesque but no location given.
4. Mound near the mouth of Massac Creek on the property of J. D. McElya. From this mound twenty skeletons were removed without finding a single artifact. Reported by C. B. Moore and examined by M. G. Miller and S. G. Weir.

McLEAN COUNTY

1. Mound on the property of A. J. Austin about four miles below Rumsey. Dark soil with many shells on the surface. Yielded sixteen burials, a lance point, a number of arrowheads and a sandstone sizer, all of crude workmanship. Described by M. G. Miller and S. G. Weir.
2. Mound on the farm of G. W. Hill, on the outskirts of Calhoun. Numerous buildings are now on the mound, which is of dark soil and of considerable size. Sixteen burials were found in this mound, the skeletons being in many positions, some flexed, some extended and some which seemed to be in a sitting posture. The artifacts consisted of several bone awls, a netting needle and a sizer. Recorded by C. B. Moore; described by M. G. Miller and S. G. Weir.

MADISON COUNTY

1. Many mounds near the Kentucky River. Mentioned by Rafinesque but no definite locations given.
2. Fort three miles east of Berea near the Big Hill Pike on the headwaters of Silver Creek. Described in this report.
3. Mound six miles due east of Richmond on Muddy Creek. Mentioned by Bennett Young and definitely located by J. B. Hoeing. Not described by either.
4. Mound near the mouth of Otter Creek 5½ miles south of Boonesboro. Mentioned by Rafinesque and definitely located by J. B. Hoeing.
5. Mound near the mouth of Otter Creek, six miles almost due south of Boonesboro and within a half mile of No. 4. Mentioned by Rafinesque and definitely located by J. B. Hoeing.

6. Mound one mile east of Paint Lick and one-third mile north of Adams Branch of Paint Lick Creek. Located by J. B. Hoeing but not described.
7. Mound just outside the city limits of Richmond on the south, and one-eighth mile west of the Kentucky Central Railroad tracks. Recorded by J. B. Hoeing.
8. Mound 1¾ miles southeast of Silver Creek Post Office and ¼ mile north of Silver Creek. Recorded by J. B. Hoeing.
9. Mound 1¼ miles northeast of Silver Creek Post Office and ½ mile from the Kentucky Central Railroad, in road junction. Recorded by J. B. Hoeing.
10. Mound 1½ miles due east of Silver Creek Post Office and ¼ mile southeast of No. 9. Recorded by J. B. Hoeing.
11. Mound 1¾ miles northeast of Silver Creek Post Office and ½ mile due east of No. 9. Recorded by J. B. Hoeing.
12. Mound in the village of Silver Creek. Recorded by J. B. Hoeing.
13. Mound in the village of Kirksville near the church. Recorded by J. B. Hoeing.
14. Mound one-eighth mile from Silver Creek, one mile west of the junction of Taylor's Fork and Silver Creek. Recorded by J. B. Hoeing.
15. Mound one-eighth mile from Silver Creek, ¾ mile west of the junction of Taylor's Fork and Silver Creek and ¼ mile east of No. 14. Recorded by J. B. Hoeing.
16. Mound on Silver Creek at the mouth of Trace's Branch, 2½ miles northwest of No. 15. Recorded by J. B. Hoeing.
17. Mound on Silver Creek, ¾ mile northwest of No. 16. Recorded by J. B. Hoeing.
18. Mound on Silver Creek, one mile southeast of No. 15. Recorded by J. B. Hoeing.
19. Mound one mile south of Richmond and three-eighths mile north of Pumpkin Run. Recorded by J. B. Hoeing.
20. Mound one-eighth mile from city limits of Richmond on the Brookstown Pike. Recorded by J. B. Hoeing.
21. Mound 2½ miles due east of Central Fork on Otter Creek on the Union City Pike and 7½ miles south of the Kentucky River. Recorded by J. B. Hoeing.
22. Mound one and one-eighth miles from Rogersville just north of the Rogersville-Duncannon Station road. Recorded by J. B. Hoeing.
23. Mound seven-eighths mile west of No. 22, one and three-eighths miles from Duncannon Station just east of the Duncannon Station-Richmond road. Recorded by J. B. Hoeing.
24. Mound on Tate's Creek, 2¼ miles from Richmond, one-eighth mile from the Richmond-Million road. Recorded by J. B. Hoeing.

25. Mound 2¾ miles from Richmond on the Richmond-White Hall road (east road to White Hall), ½ mile from West Fork on Otter Creek. Recorded by J. B. Hoeing.
26. Rock shelter on bank of Kentucky River about ¾ mile below the bridge on the Lexington-Richmond Pike. Traditionally occupied by aborigines. Contained a few flint spalls and the remains of fires which, however, were probably made by modern hunters. Examined by W. S. Webb, A. M. Miller, J. G. Black and W. D. Funkhouser.
27. Mound on which a stump was examined 107 years after the tree had been felled showed 237 rings. Reported by Bennett Young but exact locality not given.
28. Cemetery of 100 acres four miles southwest of Richmond on property of John D. Harris. Recorded by Bennett Young.
29. "Moberly Mound" six miles east of Richmond. Burial mound containing three thousand cubic yards of earth and containing six burials. One skeleton with large flint spear-head in left femur. Described by Bennett Young.

MAGOFFIN COUNTY

1. Rock house on Boyd Howard Place on Coon Creek. Reported and described by W. C. Connelley. Mentioned in this report.

MARION COUNTY

1. Many mounds near Lebanon. Mentioned by Rafinesque but definite location not given.
2. Site near Lebanon on which was found an image or bust of Aztec type. Recorded by W. M. Linney and mentioned by Bennett Young.
3. Mound near Lebanon from which were taken copper spools. Recorded by Bennett Young but exact locality not given.

MARSHALL COUNTY

1. A town site near Brewer's Hill in the southwest corner of the county. Mentioned by Rafinesque.
2. Village site and remains of shell mounds at mouth of Jonathan Creek. Described in this report.
3. Burial field on Henson Place. Described in this report.
4. Mounds on Betty Faughn Place. Described in this report.
5. Village site on McNealy Place. Described in this report.

MASON COUNTY

1. Fox Fields. Described in this report.
2. Perraut Mound. Described in this report.

3. Stone graves on property of H. M. Pyles about 2½ miles northwest of Lewisburg. A large number of graves on the crest of a ridge and a village site below the ridge on the North Fork of the Licking River. The burials on the ridge were very old and being quite superficial had been disturbed by cultivation. The village site was very rich in artifacts and yielded hundreds of arrows, knives, and other flint objects. Through the kindness of Mr. Pyles and the courtesy of Messrs. Charles and Millard Wheeler who lived on the place at the time of our visit, the authors, accompanied by Mr. W. J. Curtis, were permitted to establish a camp here and thoroughly study this interesting field.
4. Fort two miles north of Mays Lick. Mentioned by Collins.
5. Mound one mile from Dover on the Dover-Augusta Pike. Recorded by J. B. Hoeing but not described.
6. Mound 2½ miles south of Dover, 1½ miles from Minerva and ½ mile from the road. Recorded by J. B. Hoeing.
7. Mound on Lawrence Creek one mile from the Ohio River and five miles from Dover not far from the Dover-Maysville Pike. Recorded by J. B. Hoeing.
8. Mound on Lawrence Creek, ½ mile from the Dover-Maysville Pike and ½ mile from No. 7. Recorded by J. B. Hoeing.
9. Mound ¼ mile southeast of No. 8. Recorded by J. B. Hoeing.
10. Mound one mile from Lawrence Creek and one and one-eighth miles southeast of No. 8. Recorded by J. B. Hoeing.
11. Mound on Lawrence Creek 1½ miles south of No. 7. Recorded by J. B. Hoeing.
12. Mound on Beasley's Creek 2¼ miles north of Slack Post Office on the Pike to Dover. Recorded by J. B. Hoeing.
13. Mound five eighths mile from Slack Post Office on the road to Dover. Recorded by J. B. Hoeing.
14. Mound at Slack Post Office, five-eighths mile south of No. 13. Recorded by J. B. Hoeing.
15. Mound three miles from Maysville and one mile north of the Maysville-Germantown Pike. Recorded by J. B. Hoeing.
16. Mound five-eighths mile south of Fernleaf and 2¾ miles from Germantown. Recorded by J. B. Hoeing.
17. Several mounds in the city of Maysville. Mentioned by J. B. Hoeing, but not definitely located nor described.
18. Mound on the Washington-Dimmitt's Station road ½ mile from Washington. Recorded by J. B. Hoeing.
19. Six mounds one mile from Dimmitt's Station on the Washington-Dimmitt's Station road, three on each side of the road which branches off to Lewisburg. Recorded by J. B. Hoeing.

20. Three mounds on the Lewisburg road ½ mile from No. 19. Recorded by J. B. Hoeing.
21. Mound one-eighth mile east of No. 20. Recorded by J. B. Hoeing.
22. Mound on the Lewisburg road ½ mile from No. 20. Recorded by J. B. Hoeing.
23. Mound at the junction of the road from Washington to Lewisburg, ¼ mile from No. 21.
24. Mound ½ mile from Lewisburg on the Lewisburg-Washington road. Recorded by J. B. Hoeing.
25. Mound one-eighth mile from Licking River and seven-eighths mile due south of No. 24. Recorded by J. B. Hoeing.
26. Mound on a tributary of Licking River, 1¼ miles south of Washington and 1½ miles west of No. 23. Recorded by J. B. Hoeing.
27. Mound ¼ mile southeast of No. 26. Reported by J. B. Hoeing.
28. Mound about three-eighths mile south of No. 26. Recorded by J. B. Hoeing.
29. Three mounds about 2½ miles from the mouth of Lee's Creek. Recorded by J. B. Hoeing.
30. Mound on Lee's Creek ¼ mile southeast of No. 29. Recorded by J. B. Hoeing.
31. Two mounds ¼ mile west of No. 30 and ¼ mile south of No. 29. Recorded by J. B. Hoeing.
32. Two mounds on the Shannon-Plugtown road 2½ miles northeast of Sardis and five-eighths mile southwest of Shannon. Recorded by J. B. Hoeing.
33. Mound 2¾ miles up Flat Fork from where it crosses the county line and 1¼ miles directly north of the county line. Recorded by J. B. Hoeing.
34. Mound at the edge of the town of Dover. About 20 feet high and 25 feet in radius. Reported by W. J. Curtis.

MEADE COUNTY

1. Several caves near Brandenburg in which bones have been found. Mentioned by Rafinesque.

MERCER COUNTY

1. Mound on Salt River 1¾ miles from Nevada and ¼ mile from county line. Recorded by J. B. Hoeing.
2. Mound on bend of Salt River 2¼ miles almost due north of No. 1. Recorded by J. B. Hoeing.
3. Mound 1½ miles northwest of Harrodsburg and 3¾ miles north of Salt River. Recorded by J. B. Hoeing.
4. Mound on tributary of Salt River, ¾ mile northwest of No. 3. Recorded by J. B. Hoeing.

5. Mound just north of the Bohon-Duncanville road, 3¼ miles from Duncanville. Recorded by J. B. Hoeing.
6. Mound on Shawnee Run, about 3½ miles from its mouth and four miles northeast of Harrodsburg. Recorded by J. B. Hoeing.
7. Mound 1¼ miles due east of No. 6. Recorded by J. B. Hoeing.
8. Mound on Shaker's Fork, two miles from Pleasant Hill on the Pleasant Hill-McAfee road. Recorded by J. B. Hoeing.
9. Mound ½ mile west of No. 8 and located just off the same road. Recorded by J. B. Hoeing.
10. Two mounds ½ mile west of No. 9 and on the same Pleasant Hill-McAfee road. Recorded by J. B. Hoeing.
11. Mound 1¼ miles northwest of No. 10 and located a little off the Pleasant Hill-McAfee road. Recorded by J. B. Hoeing.
12. Mound in the fork of the Harrodsburg Pike two miles from Mundy's Landing and about one mile northeast of No. 11. Recorded by J. B. Hoeing.
13. Mound on Salt River one mile from the northern county line. Mentioned by Rafinesque and located by J. B. Hoeing.

METCALF COUNTY

1. "Anderson Cave" on Gassoway farm about 2½ miles from the Barren County line at Cave Ridge. Has yielded pottery, pestles, flints, limestone and hoes and horn artifacts. Examined and reported by W. C. Eyl.

MONROE COUNTY

1. Circular graves reported by F. W. Putnam and mentioned by Bennett Young.

MONTGOMERY COUNTY

1. Mound on the farm of W. L. Ricketts, about 4½ miles south of Mt. Sterling on the Oldham Pike. Mound is about 50 feet in diameter and 24 feet high; growing on top are 14 trees (second growth, 10-14 inches in diameter)—one locust, two walnuts and eleven hackberries. Mound was opened by Mr. G. B. Cockrell, the former owner of the farm, about fifteen years ago. Mr. Cockrell, according to his nephew, Mr. Clell Cockrell of Mt. Sterling, secured a very large number of artifacts and uncovered many skeletons. A number of trenches and deep holes in the mound show where Mr. Cockrell dug. Mr. Clell Cockrell made a small excavation in the west side of the mound and found a number of human bones and the fragments of a pipe, the latter being now in the possession of W. S. Webb. W. D. Funkhouser, W. S. Webb and Clell Cockrell dug into the mound on July 19, 1924, opening trenches from the south and west sides where the mound had apparently never been

disturbed, but found nothing except a few fragments of human bones and two human teeth on the surface and the fragments of a human left scapula in the south trench. A second excavation on July 26 continued the trenches to the bottom of the mound, but nothing further was found and the work was discontinued.

2. Grave at the corner of the farm of Henry Hunt on the Gibson Dirt Road, off the Carmago-Mt. Sterling Pike about 7 miles from Mt. Sterling. The deed to this farm designates the "center of Indian Grave" as the corner of Mr. Hunt's place. Grave consists of a pile of slate, shale and loose sandstone rock about 30 feet in diameter and two feet high. Superficial digging showed no evidences of artifacts nor bones, but a complete excavation was not made. Examined by W. S. Webb and W. D. Funkhouser.

3. Mound on opposite side of the farm mentioned in No. 2 is evidenced by stones which had originally formed a circle but many of which had been moved. This is probably the mound mentioned by Rafinesque as on Brush Creek. Examined by W. S. Webb and W. D. Funkhouser.

4. Mounds on Somerset Creek and Buck Creek. Mentioned by Rafinesque but not definitely located.

5. Dr. Edmond D. Wells of Middlesboro, reports the finding in Montgomery County of what appeared to be a stone image about the size of a man's head by workmen who were grading a road. It was found six feet underground at a high point and was apparently carved or molded from some very hard substance to resemble a face. The artifact is in the possession of Dr. Wells.

6. Mound on the farm of Dr. S. E. Spratt, about 4½ miles south of Mt. Sterling on the Oldham Pike, across the pike from the W. L. Ricketts Farm. Mound 25 feet in diameter and five feet high. Shows evidences of an old trench through the center from north to south. Three trenches were dug by the authors from the edge to the center of the mound in places where there were no signs of previous digging. Found fragments of one skeleton with bones badly broken and scattered. No artifacts of any kind. Examined by W. D. Funkhouser and W. S. Webb.

7. Elliptical mound on property of Mrs. Bell Stafford, ¾ mile from Carmago on the dirt road. A sand mound which had apparently been excavated. Visited by W. S. Webb in July, 1924, but not carefully examined.

8. Mound on city property (old negro cemetery) in Mt. Sterling. Opened by Mr. Clell Cockrell in July, 1924. Mr. Cockrell secured several flint artifacts and the leg bones of a human skeleton. Visited by W. S. Webb and W. D. Funkhouser, July 19, 1924, but no excavation was made. This is a small circular mound about eight feet high with a large elm tree on top. On August 3, 1924, Mr. Cockrell reported the finding of a skeleton on the bottom of the mound under 6½ feet of earth. With the bones were found two buttons, which were examined by W. D. Funkhouser and reported as follows: "Larger button just the diameter of a nickel; brass, face smooth at edges, obliterated design in center; on the reverse above the shank a figure of a crown; below the shank the words, "Treble Gilt"; apparently from a uniform. Smaller button just the diameter of a dime; brass; smooth on face; large shank on back. On August 11, 1924, Mr. Cockrell sent to the University the following human bones which were undoubtedly very old: one left tibia, fragments of both humeri and both ulnae, three skull fragments, one lower molar tooth. Mr. Cockrell reported that during his absence from the mound, boys carried away or destroyed all other bones of the skeleton.

9. Mound on farm of Greer Brothers, Jeffersonville. Mound about 25 feet in diameter. Partly plowed over. In sod in summer of 1924. Flint chips in abundance about one hundred feet from the mound. Reported by W. S. Webb, but not excavated.

10. Large mound on farm of Mr. Gaitskill, about one mile from Mt. Sterling. Elliptical, 70 yards long, 520 feet in circumference, 60 feet high. This is supposed to be the mound for which the city of Mt. Sterling was named.

11. Large mound on the property of Major D. J. Burchett. As broad as the Gaitskill mound and higher (about 80 feet high) but not so long. It is heavily timbered with very large trees and has caved in or been dug into at the top. Visited and described by W. S. Webb, but not excavated.

12. A small mound about fifty yards from No. 11. The top of the mound has been opened but there is no record of contents. Reported by W. S. Webb.

13. A medium sized mound which forms a triangle with Nos. 11 and 12. Covered with large trees and caved in or dug into at the top. Reported by W. S. Webb.

14. A mound on the property of Mrs. Clarence White, one mile from No. 13, ¾ mile from the road, 3½ miles from Mt. Sterling. Visited by W. S. Webb, but not described nor excavated.

15. Small mound in front yard of R. T. Judy, on Judy Pike, 6½ miles from Mt. Sterling. Reported by W. S. Webb.

16. Mound on Oldham Pike about 1½ miles from Carmago Pike. Reported by Robert Moss.

17. Burial grounds on the farm of Samuel and Walker Mason about eight miles southwest of Richmond on the Lancaster Pike. One grave supposed to have contained the skeleton of a "giant." Reported in the "Richmond Register," Oct. 26, 1924.

MUHLENBERG COUNTY

1. Mound one mile north of Greenville, on a branch of Baptiste Creek. Mentioned by Collins.
2. Twenty-five mounds are referenced as having been personally visited by Rothert in his history of Muhlenberg County. Many of these contained skeletal material but few, if any artifacts. Photos.

NELSON COUNTY

1. Stone works four miles from Bardstown. Mentioned by Rafinesque and described by Bennett Young.
2. Fort 5½ miles from Bardstown, on the New Haven Pike. Mentioned by Bennett Young, but not described.

NICHOLAS COUNTY

1. Graves and burial grounds seven miles north of Sharpsburg and five miles south of Upper Blue Licks. Mentioned by Collins.
2. Blue Lick Springs. Described in this report.
3. Clay Mounds. Described in this report.
4. Berry Mound. Described in this report.
5. Stone graves near Carlisle. Described in this report.
6. Jim Reed Mound. Described in this report.
7. Stone grave on the A. C. Bontin farm one mile east of East Union. Two skeletons, one lying at full length and the other in a sitting position. An arrow-head found with the second skeleton, which, if buried with the body is a unique record of an artifact in a stone grave. Reported by A. C. Bontin and W. J. Curtis.

OHIO COUNTY

1. Mound at Green River Post Office. Described in this report.
2. "Indian Knoll." Described in this report.
3. "Giants Grave," one mile almost due east of Rockport. Mentioned by Collins.

OLDHAM COUNTY

1. Cache of artifacts found. Recorded by Rafinesque, but no location given.

PENDLETON COUNTY

1. Mounds near the fork of Licking River. Mentioned by Rafinesque, but not definitely located.

PERRY COUNTY

1. Numerous mounds near Hazard. Mentioned by Rafinesque, but none of them described nor definitely located.

ROBERTSON COUNTY

1. Graves on property of W. J. Curtis. Mentioned in this report.
2. Stone graves on farm of Ben Linville, near the mouth of Johnson Creek, 6½ miles southwest of Mt. Olivet. Yielded a few human bones, but no artifacts. Investigated and reported by W. J. Curtis.
3. Stone grave on a high point overlooking the Piqua Valley and Johnson Creek, on farm of S. Curtis, now owned by Luther Barnet. Yielded human bones, but no artifacts. Reported by W. J. Curtis.
4. Two stone graves about 100 yards apart on a high point overlooking the mouth of Johnson Creek, where it flows into the Licking River, about 1½ miles west of Piqua, on the farm of Uriah Wells, now owned by Jerry Brumagen. Yielded three human skeletons from one grave and one from the other, all in fairly good condition, but no artifacts. Reported by W. J. Curtis.

ROCKCASTLE COUNTY

1. Mounds near Mt. Vernon. Mentioned by Rafinesque, but no exact location given for any of them.

SCOTT COUNTY

1. Habitation Mound. Described in this report.
2. Mounds on Yates Farm. Described in this report.
3. Cave on property of Dr. W. N. Offutt. Of considerable size and reported to contain bones. Has never been explored. Reported by W. N. Offutt.
4. A town site on North Elkhorn, near Georgetown. Mentioned by Rafinesque, but not definitely located.

SHELBY COUNTY

1. Several mounds south of Shelbyville. Mentioned by Rafinesque, but no exact location given for any of them.

SIMPSON COUNTY

1. A "giant's grave," found near Franklin. Mentioned by Rafinesque.

TODD COUNTY

1. Several caches of prehistoric implements found three miles from Trenton. Mentioned by Rafinesque.

TRIGG COUNTY

1. A walled town on the Cumberland River near Canton. Mentioned by Rafinesque.
2. Several mounds on Little Run near Cadiz. Mentioned by Rafinesque.

3. Cache of artifacts found. Recorded by Rafinesque, but no definite location given.

UNION COUNTY

1. Caches of artifacts found near Uniontown. Recorded by Rafinesque.
2. Cache of artifacts found six miles from Caseyville. Recorded by Rafinesque.
3. Group of mounds on Lost Creek, containing forty-eight tumuli. Explored by S. S. Lyon and mentioned by Bennett Young.
4. "Lindsay Mound" on Buffalo Creek, four miles from Raleigh, contained bodies placed in a circle like the spokes of a wheel, with the heads pointing toward the center of the circle and the faces turned toward the left side. Explored and reported by S. S. Lyon.
5. Mound near Uniontown contained skeleton of a man in a sitting posture, surrounded by many beautiful artifacts, including notched flint implements, grooved stone discs, a copper awl, a copper disc covered with woven fabric and a pottery vessel. Explored and examined by S. S. Lyon.
6. Mound on Lost Creek, was erected over a stone pavement and contained a burial pit five feet deep filled with skeletons. Explored and recorded by S. S. Lyon.

WARREN COUNTY

1. Remains of town on Big Barren River. Mentioned by Rafinesque, but not definitely located.
2. Mounds near Bowling Green. Mentioned but not definitely located by Rafinesque and probably the ones which are known to the students of Western State College and which they have examined. We have not seen them and do not know their exact location.
3. Fort twelve miles north of Bowling Green on the south bank of Green River. Fortifications in shape of parallelogram, 750 feet on each side with stone walls at either end. Described by Bennett Young.
4. Village site at Rainbow Rock near Auburn. Many artifacts found in vicinity. Reported by Elizabeth Davis.
5. Village site and flint workshop on C. A. Smith farm two miles north of Bowling Green. Visited by W. D. Funkhouser and mentioned in this reoprt.

WAYNE COUNTY

1. Hines Cave. Described in this report, also in reports of Prof A. M. Miller.
2. Copper's Cave. Described in this report.
3. Hogg Cave. Described in this report.

WHITLEY COUNTY

1. Remains of a town on the Cumberland River above Williamsburg. Mentioned by Rafinesque but not located.
2. Mounds on Laurel and Watts Rivers. Mentioned by Rafinesque but no exact location given for any of them.

WOODFORD COUNTY

1. An ancient fortification near Lovedale. Mentioned by Rafinesque.
2. Ancient fort. Mentioned in this report.
3. A flint ledge and two springs undoubtedly used at least by modern Indians. One mile south of Tyrone Ferry on the Kentucky River on the present Boy Scouts' Camp. Visited by W. S. Webb and W. D. Funkhouser.

BIBLIOGRAPHY

In the long list of publications on American Archaeology and Anthropology, the following titles contain references to the State of Kentucky or have been quoted or referred to in this report.

Allen, J. A.
1876. The American Bison, Living and Extinct.
Memoirs Geological Survey of Kentucky I: Part 2.

Beckner, Lucien
Indian Burial Ground at Fullerton, Kentucky, Ky. Geol. Surv., Vol. XXVI, pp. 261-272. 1927.

Burroughs, W. G.
1926. Geography of the Kentucky Knobs. (Prehistoric People of the Knobs.) Ky. Geol. Survey, Series VI, Vol. XIX, 136-160. Map. Frankfort, 1926.

Bushnell, David I.
1920. Native Cemeteries and Forms of Burial East of the Mississippi.
Bureau of Ethnology, Bulletin 71.

Carr, Lucien
1897. Dress and Ornaments of Certain American Indians.
Proceedings of the American Antiquarian Society, n. s., XI: 381-454.

Carr. Lucien, and Shaler. N. S.
1876. On the Prehistoric Remains of Kentucky.
Memoirs Geological Survey of Kentucky, I: Part 4. 1-31. 7 plates.

Catlin, George
1841. The Indians of North America.
Published by H. G. Bohm, London.

Collins, Lewis
1874. History of Kentucky. 2nd. Ed. Covington.

Conant, A. J.
1879. Footprints of Vanished Races in the Mississippi Valley. Chancy R. Barnes. St. Louis.

Cresson, H. T.
1890. Early Man in the Delaware Valley.
Proceedings of the Boston Society of Natural History, XXIV: 141-150.

Cumings, Samuel
1829. The Western Pilot for 1829. Published by N. and G. Guilford, Cincinnati.

Durrett, Reuben T.
1908. Traditions of the Earliest Visits of Foreigners to North America.
Filson Club Publication No. 23.

Farnham, John N.
1820. Extract from a letter describing Mammoth Cave in Kentucky.
Transactions of the American Antiquarian Society I: 355-361.

Filson, John
1784. Discovery, Settlement and Present State of Kentucky.

Fiske, Moses
1820. Conjectures Respecting the Ancient Inhabitants of North America.
Transactions of the American Antiquarian Society I: 300-307.

Fewkes, Jesse Walter
1910. Great Stone Monuments in History.

Fowke, Gerard
1900. Stone Graves in Brown County, Ohio.
Ohio Archaeological and Historical Publication IX: 193-204.

Funkhouser, W. D.
1925. Wild Life in Kentucky.
Kentucky Geological Survey, Vol. XVI.

Grinnell, George Bird
1923. The Cheyenne Indians. 2 vols.
Yale University Press.

Haase, Adelaide R.
1910. Index of Economic Material in Documents of the States—Kentucky 1792-1904.
Carnegie Institution of Washington.

Hall, Mitchell
History of Johnson County (Ky.) Mss.

Harrington, M. R.
1909. The Rock Shelters of Armonk.
Anthropological Papers. American Museum of Natural History, III: 125-138.
1922. Cherokee and Earlier Remains on Upper Tennessee River.
Indian Notes and Monographs, 1922.

Hawly, Henry
History of the Shawnee Indians.

Hewitt, J. N. B.
1920. A Constitutional League of Peace in the Stone Age of America.

Hodge, F. W.
Smithsonian Publication No. 2572.

Hoeing, J. B.
1913. Kentucky Geological Survey, Series IV: Volume 1.
Handbook of Indians North of Mexico.

Holmes, W. H.
1883. Prehistoric Textile Fabrics of the United States Derived from Impressions on Pottery.
Bureau of American Ethnology. Third Annual Report.
1896. Prehistoric Textile Art of Eastern United States.
Bureau of American Ethnology. Thirteenth Annual Report.

Hovey, Horace Carter
1912. Mammoth Cave of Kentucky.
Published by John P. Morton & Co., Louisville.

Imlay, G.
1793. Western Territory of North America.

Jillson, Willard Rouse
1920. Contributions to Kentucky Geology.
Department of Geology and Forestry of Kentucky. Series VI, Bulletin 4.
1923. The Big Sandy Valley, Illus., John P. Morton and Co., Louisville. Ky.

Linney, W. M.
1881. Mounds in Boyle County, Kentucky.
Smithsonian report for 1881.

Lyon, Sidney S.
1871. Report on the Exploration of Ancient Mounds in Union County, Kentucky.
Annual Report of the Smithsonian Institution for the year 1870.

McAfee, Robert B.
1816. A History of the Late War in the Western Country.
Published by Worsley and Smith. Lexington.

MacLean, J. B.
1879. The Mound Builders.

Metcalf, S. L.
1821. A Narrative of the Most Remarkable Occurrences in the Life and Travels of Col. James Smith during his Captivity Among the Indians, from the year 1755 until 1759.
In Narrative of Indian Warfare in the West.

Michaux, Francois Andre
1805. Travels in the Westward of the Allegany Mts., in the states of Ohio, Ky., and Tenn., and return to Charlestown thru the upper Carolinas.

Miller, Arthur M.
1919. The Geology of Kentucky.
Department of Geology and Forestry of Kentucky, Series V; Bulletin 2.
1923. Recent Cave Explorations in Kentucky for animal and human remains. Ky. Geol. Survey, Series VI, Vol. X, 107-113. Frankfort, 1923.
1925. Geology of Woodford County. (Archaeology) Ky. Geol. Survey, Series VI., Vol. XXI, 123-125. Frankfort, 1925.

Mills, William C.
1902. Excavations of the Adena Mound.
Ohio Archaeological and Historical Quarterly X: 4.
1904. Explorations of the Gartner Mound and Village Site.
Ohio Archaeological and Historical Quarterly XIII: 2.
1906. Explorations of the Baum Prehistoric Village. Ohio Archaeological and Historical Quarterly XV: 1.
1907. Explorations of the Edwin Harness Mound.
Ohio Archaeological and Historical Quarterly XVI: 2.
1909. Explorations of the Seip Mound.
Ohio Archaeological and Historical Quarterly XVII: 2.
1912. Archaeological Remains of Jackson County.
Ohio Archaeological and Historical Quarterly II: 2.
1916. Exploration of the Tremper Mound.
Ohio Archaeological and Historical Quarterly XXV: 3.
1917. Explorations of the Westenhaver Mound.
Ohio Archaeological and Historical Quarterly XXVI: 2.

Mitchell, Samuel L.
1820. Communications to the American Antiquarian Society.
Transactions of the American Antiquarian Society I: 313-355.

Moore, Clarence B.
1912. Certain Aboriginal Remains on the Black Warrior River.
Journal of the Philadelphia Academy of Natural Science XIII: 125-244.
1916. Some Aboriginal Sites on Green River, Kentucky.
Journal of the Philadelphia Academy of Natural Science XVI: 431-487.

Moorehead, Warren K.
1889. Fort Ancient. 129 pp. 37 plates.
1898. The Hopewell Group.
American Archaeologist, May 1897-Feb., 1898.
1906. Explorations at Hopkinsville, Kentucky.
Phillips Academy Bulletin III: 115-120.
1908. Fort Ancient, Warren County, Ohio.
Phillips Academy Bulletin IV: Part 2.
1910. The Stone Age in North America.

Moorehead, Warren K. with Peabody, Charles, q. v.

Nelson, N. C.
1917. Contributions to the Archaeology of Mammoth Cave and Vicinity, Kentucky.
Anthropological Papers. American Museum of Natural History XXII: Part 1.

Orchard, William C.
1920. Sandals and Other Fabrics from Kentucky Caves.
Indian Notes and Monographs. Heye Foundation.

Peabody, Charles, and Moorehead, Warren K.
1904. Exploration of Jacob's Cavern, McDonald County, Missouri.
Phillips Academy Bulletin I.

Pepper, George H.
1920. A Stone Effigy Pipe from Kentucky.
Indian Notes and Monographs. Heye Foundation.
1921. A Wooden Image from Kentucky.
Indian Notes and Monographs. Heye Foundation.

Peschell, Oscar
1876. The Races of Men and their Geographical Distribution.

Putnam, F. W.
1868. Miscellaneous Articles.
Annual Report of the Peabody Museum of American Archaeology and Ethnology.
1871. Formation of Mammoth Cave.
American Naturalist V: 739-744.
1875. Archaeological Researches in Kentucky and Indiana with Description of Salt Cave.
Proceedings of the Boston Society of Natural History XVII: 314-332.
1875. Archaeological Exploration in Kentucky and Indiana.
American Naturalist IX: 410-415.
1875. Archaeological Researches in Kentucky.
Bulletin Essex Institute VII: 2-9.

Rafinesque, C. S.
1824. Ancient History or Annals of Kentucky.

Roosevelt, Theodore
1916. How Old Is Man?
National Geographic Magazine XXIX: 111-127.

Rothert, Otto A.
1913. A History of Muhlenberg County (Ky.) Illus. John P. Morton and Company, Louisville, Ky.

Schrabisch, Max
1909. Indian Rock-Shelters in Northern New Jersey and Southern New York.

Anthropological Papers. American Museum of Natural History III: 141-165.

1926. Aboriginal Rock Shelters.
Proceedings Wyoming Historical Society XIX.

Shaler, N. S.

1876. On the Age of the Bison in the Ohio Valley.
Memoirs Geological Survey of Kentucky I: 232-236.

1876. On the Antiquity of Caverns and Cavern Life in the Ohio Valley.
Memoirs Geological Survey of Kentucky I: 1-13.

Shaler, N. S.. with Carr, Lucien, q. v.

Squier, E. G., and Davis, E. H.

1847. Ancient Monuments of the Mississippi Valley.
Smithsonian Contributions to Knowledge I.

Smith, Harlan I.

1910. The Prehistoric Ethnology of a Kentucky Site.
Anthropological Papers. American Museum of Natural History VI: Part 2.

Thomas, Cyrus

1894. Report on the Mound Exploration of the Bureau of Ethnology.
Twelfth Annual Report, Bureau of Ethnology.

Thruston, Gates P.

1897. The Antiquities of Tennessee and Adjacent States.
Third Edition. (First Edition, 1890.)

Young, Bennett H.

1910. The Prehistoric Men of Kentucky.
Filson Club Publication No. 25.

Walcott, Charles D.

1916. Evidences of Prehistoric Life.
Smithsonian Publication No. 2389.

Webb, William S.

1925. Report on New Double Conoidal Pipe from Kentucky.
American Anthropologist XXVII: 441-446.

1927. A note on recently discovered evidence throwing light on the probable age of a Kentucky site.
American Anthropologist XXIX: 62-68.

Wilkins, Charles

1820. Account of an Exsiccated Body of Mummy Found in the Mammoth Cave, Kentucky.
Transactions of the American Antiquarian Society I: 360-364.

Willoughby, Charles C.

1917. The Art of the Great Earthwork Builders.
Smithsonian Publication No. 2470.

Wilson, T.

1897. Arrow-Points, Spear-Points and Knives.
Report of the United States National Museum I: 1-811.

Winterbotham, W.

1795. An historical, geographical, commercial and philosophical view of the United States. (Refers to Kentucky salt springs and mammoth remains.) London.

Wissler, Clark

1915. Riding Gear of the North American Indians.
Anthropological Papers. American Museum of Natural History XVII: 1-38.

1923. State Archaeological Surveys.
Publication National Research Council 1923.

INDEX

A. Page

Algonquin 67, 153, 161, 305
Allen County 310
American Indians 304
Amphibians 2, 31, 303
Amphitheaters 149
Anderson County 310
Animal pipes 251
Animal-teeth pendants 201
Archaeological Survey 309
Arrow-making 217
Arrows 212, 213
Arthur, Gabriel 306
Artifacts 53, 54, 55
Ashbrook, W. J. 311
Atlantis Tradition 48
Audubon, J. J. 303
Awls 180, 181
Axes 234, 235, 236, 237
Ax handles 236
Aztecs 100

B.

Ballard County 310
Banded slate 237
Banner stones 264
Bar amulets 291
Bar gorgets 263
Barren County 311
"Barrens" 300
Bath County 311
Beads 89, 190, 192
Bear-skull gorget 117
Bear teeth 104, 203
Beaver 41, 302
Beckner, Lucien 109
Bell County 312
Bell pestles 242
Big Bone Lick 41
Bigler, C. R. 319
Bird arrows 219
Bird pipes 250
Bird-stones 290
Bison 43, 301
Blackfeet 304
Blanks 206
Blue Lick 41
Boat-stones 287
Bolas 267
Bolinger, Charles 251
Bone awls 180, 181
Bone beads 190
Bone celts 182
Bone decorations 195
Bone fish-hooks 188
Bone flakers 184, 185

Page

Bone gorgets 200
Bone hairpins 201
Bone implements 177, 179
Bone knives 186
Bone ornaments 189
Bone splinters 178
Bone whistles 188
Bontin, A. C. 330
Boone County 312
Boone, Daniel 174
Boone's Cave 137
Bottles 277
Bottle stoppers 278
Bourbon County 312
Bowls 276
Bows 186
Bow-string sizers 289
Boyd, R. E. 136
Boyle County 312
Brachiopods 15
Bracken County 313
Bradshaw, F. E. 199, 285
Bratcher, W. A. 145
Breathitt County 313
Breckinridge County 313
Breck Smith Cave 136
Brown, Jared 155
Bryozoans 14, 15
Buffalo 301
Buffalo Creek 315
Burchett, D. J. 329
Burial fields 101
Burial mounds 84
Burial ridge 166
Burials 57, 58
Burks, Armp 279
Butler County 314
Buzzard's Cliff 145

C.

Cairns 163
Caldwell County 314
Calloway County 314
Campbell County 314
Camp Nelson 320
Camp sites 120
Cannel coal 204
Canon-bone awls 181
Carboniferous Period 1, 27
Caribou 42
Carlisle 75
Carlisle County 315
Carroll County 315
Casey County 315
Catacomb Legend 140

Page

Catawbas 305
Catlinite 204
Cave conditions 138
Cave Dwellers 123
Celts 224, 238, 239
Cenozoic 38, 39
Cephalopods 21
Ceremonial mace 293
Ceremonial mounds 75
Cherokee 304
Cherry, E. A. 314
Cheyenne 304
Chickasaw 304
Chief Double-Head 251
Childress, P. F. 145
Chipped stone 205
Chipping flint 211
Chisels 241
Choctaw 304
Christian County 315
Chunkee 242, 259
Cincinnati Arch 25
Clark County 315
Clark, George Rogers 174
Clark, L. J. 312
Clay 271
Clay County 316
Clay, Samuel S. 85
Claxon, G. B. 310
Cliff-Dwellers 143, 178
Cloverport 313
Coal Measures 9
Cockrell, Clell 327
Cockroaches 31
Colanders 276
Colossal Cavern 123
Conchoidal fractures 225
Cones 247
Conkwright, Bessie 130
Connelly, W. C. 146
Cook, Harold 53
Coon Creek 146
Cooper's Cave 134
Copper axes 237
Corals 12, 13
Cotrell, Harry 159
Cove Hollow 145
Cow Cliff 145
Creeks 304
Crees 304
Cremation 65
Crinoids 13
Crystal Cave 123
Cub Run 136
Cultures 62
Curtis, Wm. J.
24, 165, 183, 191, 246, 308, 309, 326
Cylindrical pestles 242, 245
Cysts 163

D.

Page

Davis, Elizabeth 332
Davis, J. M. 81, 130
Decorated cylinders 294
Decorated game stones 261
Decorated shards 275
Deer 42, 301
Deformities 98
Delawares 304
de Longeil 40
Devonian 26
Dinosaurs 35, 36
Discoidals 258
Discs 231
Dobbs, J. L. 279
Dodge, Victor K. 130, 312
Dog Creek 136
Dortch, W. E. 156
Double-bitted celts 240
Double-bladed axes 235
Double burial 93
Double conoidal pipes 253
Double crescents 295
Draper, L. O. 319, 320
Drawing knife 183
Drilled artifacts 220
Drills 221
Dry Fork 311
Duck bowls 284

E.

Ear ornaments 201, 263
Edmonson County 316
Egyptian Theory 50
Elbow pipes 254
Elk 42, 301
Ellipsoidal pestles 242
Engelken, F. H. 312
Engraved gorgets 198, 199
Eocene 38
Estes, J. A. 167
Evans, R. B. 310
Eye-spots 208

F.

Face pipes 255
Falls of the Ohio 26
Falls of the Ohio, Battle of 174
Fayette County 316
Ferguson, Sut 159
Filson, John 174
Fish 186, 303
Fishhooks 188
Fish images 294
Fishing 161
Fish nets 186
Fish-scalers 225
Fish spines 182
Flakers 184
Flat celts 238

Page

Flexed burials 87, 110
Flint 205
Flint arrows 212, 219
Flint blanks 206
Flint celts 224
Flint drills 220, 222
Flint hoes 226
Flint hooks 294
Flint knives 212
Flint quarries 205
Flint scrapers 225
Flint shops 207
Flint traffic 208
Flying reptiles 35
Fortifications 77
Fossils 8
Fox 302
Fox Fields 101, 188, 191, 297
Franklin County 317
French, T. M. 317
Ft. Ancient 63
Fullerton 78
Fullerton Field 108
Full grooved axes 235
Fulton County 317

G.

Gallatin County 317
Game stones 259
Garrard County 317
Garvin, Mat 83
Gastropods 19
Geologic Eras 6
Geralds, J. F. 150
Gish, Christopher 40
Glacial Period 2, 3, 39
Glover, Armistead 167
Glover, Mrs. R. D. 167
Glover, R. G. 167
Goddard, P. E. 52
Goforth, Samuel 46
Gorgets 195, 261
Grand Cave 123
Gravel beds 205
Graves 58
Green County 318
Greenup County 318
Griffiths, Maurice 173
Grinding 234
Grooved axes 235
Ground stone artifacts 233
Grouse 302
Gulf of Mexico 1

H.

Haggin, L. L. 316
Hahn, T. M. 310
Hairpins 201
Hammerstones 229
Hancock County 318

Page

Handles 236
Harlan County 318
Harpoons 222
Harrison County 319
Harrod, James 174
Hart County 319
Headless skeleton 88
Hearths 76
Hemitite 265
Hemitite axes 237
Henderson County 319
Hendrick, A. S. 130
Henson, Albert 159
Henson, Jesse 119, 159
Henson, W. A. 159
Heye Foundation 296
Hickman County 320
Hill, G. W. 322
Hine's Cave 129, 332
Hiwasee Island 197
Hoeing, J. B. 312
Hoes 226
Hogg Cave 135, 332
Holmes, William H. 209
Hominy-holes 143, 144, 244
Hopewell 64
Hopewell Group 203
Hopi 304
Hopkins County 320
Horn arrow-points 187
Horn flakers 184
Horn implements 177
Horn knives 186
Horn tips 187
Horse 42
Horse Cave 123
Howard, Boyd 146
Howe's Valley 145
Hrdlicka, Ales 155, 161
Hudson Bay 1
Hudson, W. A. 91
Hurons 304

I.

Ichthysauria 32
Imitation teeth 204
Indian Knoll 155
Indian trails 148
Insects 303
Irish tradition 49
Iroquois 66, 305

J.

Jaggers, R. E. 150
Jefferson County 320
Jefferson, Thomas 40
Jessamine County 320
Jillson, W. R. 295
Johnson County 321

Page

Johnson, Frances 146
Johnson, W. D. 320
Jonathan Creek 246
Judy, R. T. 329

K.

Kentucky Mummy 128
Kickapoo 304
Kitchen middens 56
Klauder, H. 319
Knight, F. M. 156
Knives 186, 211
Knox County 321

L.

Lafferty, Mrs. W. T. 173
Lap stones 245
Larue County 321
Laurentia 1
Layson, Charles 312
Lewis County 321
Lewis, T. H. 318
"L" gorgets 291
Limestone hoes 228
Lincoln County 321
Linney, W. M. 324
Livingston County 321
Lizards 39, 303
Logan County 322
Loligo pealii 22
Looms 266
Lost Creek 332
Lost Tribes of Israel 50
Lugs 274
Lyen, J. B. 310
Lynn's Cave 137
Lyon, S. S. 332

M.

McBrayer, M. C. 137, 310
McCollum, J. W. 130
McConnell's Run 42
McCracken County 322
McGee Spring 311
McLean County 322
McNealy, Tom 159
Madison County 322
"Mad-Stones" 262
Magoffin County 322
Maltese Cross 103, 175
Mammoth 44, 45
Mammoth Cave 123
Mandans 292
Mansfield, J. N. 150
Marginella Shells 193
Marion County 324
Marshall County 324
Mask gorget 198
Mason County 324

Page

Mastodon 45, 46
Mayo, J. C. C. 251
Meade County 326
Medicine-men 288
Megalonyx 40
Mercer County 326
Mesh spacers 186
Mesozoic 2
Metapodal bone 183
Metcalfe County 327
Methods of chipping flint 206
Methods of drilling 221
Miami 304
Micmac pipes 252
Miller, A. M. 130, 244, 332
Miller, G. S. 155
Miller, H. P. 146
Miller, M. G. 314
Mills Spring 128
Mississippian 2, 30
Mohawks 304
Mohicans 304
Mongolian Theory 49
Monitor pipes 252
Monroe County 327
Montgomery County 327
Moore, C. B. 153, 314
Moore, James F. 174
Moorehead, W. K. 163
Moose 43
Mortuary vessels 278
Mound Builders 71
Muddy River 322
Muhlenberg County 330
Muskoki 305
Musk-ox 43
Mussel 17
Mutilations 100

N.

Navahoe 304
Necklaces 202
Nelson County 330
Neolithic man 47
Net sinkers 247
Netting needles 186
Newport 314
Nicholas County 330
Non-symmetrical beads 190
Norse tradition 49
Northern Invasion Theory 50
Norwood, J. C. 296
Notched hoes 226

O.

Observation mounds 74
O'Byam's Fort 320
Octopus 21
Offutt, W. N. 331

Page

Ohio County 330
Oldham County 330
Olivia shells 192
Omahas 304
Onyx Cave 123
Opossum 303
Ordovician 9, 10
Ornamentation 56
Osages 304
Oval celts 238
Ovoid pipes 253

P.

Pack, A. T. 107
Paint cups 297
Paint Lick 317
"Painted Sticks" 305
Panther 302
Partly grooved axes 236
Pawnee 305
Pearly Nautilus 22
Peccary 42
Pecking 233
Pelecypods 16
Pendants 193, 201
Pendleton County 330
Pennsylvanian 5, 30
Percussion 206, 230
Perrant, Joe 92
Perry County 330
Pestles 242, 243
Phelp's Cave 44, 135
Philbeck, Clyde 159
Phoenician Tradition 48
Pictographs 294
Pigeons 302
Pine Mountain School 318
Pipes 248
Pipestone 204
Pirtle, George 146
Piutes 304
Play-balls 241
Pleistocene 2
Plesiosauri 33
Plummets 265
Pot handles 274
Pottery 269
Pottery beads 281
Pottery manufacture 272
Pottery markers 282
Pottery pipes 281
Pre-Cherokee 67, 199
Pre-Columbian Times 299
Prehistoric surgery 100
Proboscidea 44
Protozoans 303
Pterosaurs 33
Pueblo 305
Purchase Region 1, 30

Q.

Page

Quarries 205, 207, 208
Quarry blanks 210
Quarry shops 208
Quartz 205
Quicksand 75

R.

Raccoon 303
Race-track 165
Ranck, G. W. 140
Rattlesnake 302
Rattlesnake designs 196
Ray, G. W. 318
Recent animals 300
Record gorgets 261
Reed drills 220
Refuse mounds 83
Reptiles 32
Rim shards 276
River gravels 205
River people 153
Roberts, George B. 146
Robertson County 331
Rockcastle County 331
Rock-houses 143
Rock-shelters 143

S.

Salamander 34
Salts Cave 123, 296
Sand Cave 149
Sandals 296
Scalers 225
Scott County 331
Scrapers 223
Sedimentary rocks 5
Seminoles 304
Serrated arrow-points 218
Sex worship 200
Shards 274, 275
Shawnee 304
Shelburn, E. 137
Shelby County 331
Shell 179
Shell artifacts 177
Shell beads 192
Shell decorations 195
Shell discs 195
Shell gorgets 196, 200
Shell head-dress 88
Shell hoes 188
Shell mounds 153, 154, 157
Shell necklaces 193
Shell ornaments 189
Shell pendants 193, 194
Shell spoons 188, 189
Shelter roofs 80
Sherron, S. S. 167
Silurian 25

Page

Simpson County 331
Sinkers 267
Sinks 125
Sioux 305
Siouxian pipes 257
Sirls, Homer 159, 246
Skeggs Creek 311
Skeletons 61
Skull gorgets 115
Skunk 303
Slate axes 237
Slate gorgets 261
Slippers 296
Sloth 41
Slug 19
Smith, C. A. 83, 332
Smith, Harlan I. 101
Smoking 248
Snail 18
Snakes 302
Snoddy, Leland 130
Spatulate forms 293
Spears 213
Sponges 11
Spratt, S. E. 328
Spuds 292
Squid 20
Stalactites 133
Staples, J. H. 316
States, M. N. 167
Stegosaurus 37
Stone celts 238
Stone discs 231
Stone-grave Culture 65
Stone-grave People 163
Stone mills 245
Swine 42

T.

Tait, W. E. 130
Tapir 41, 42
Tarsometatarsus 182
Taylor, Cella 173
Taylor, G. M. 314
Taylor, Macy 318
Taylor, R. W. 155
Tempering pottery 271
Teeth 147, 193
Textiles 297
The "Barrens" 300
The Castle 319
The Jenny Wiley Ford 251
"Thunder Bird" 265
Todd County 331
Todd, Levi 174
Totem pipes 254, 255
Toulmin, H. 172
Towles, Sue 319

Page

Trade-pipes 248, 257
Trigg County 331
Trilobites 23
Triskele 197
Tubular pipes 249
Turk, J. W. 311
Turkey 302
Turkey-calls 294
Tursted skulls 97
Turtle-backs 206, 211
Tygart Creek 107
Types of arrows 212, 219
Types of skulls 96

U.

Ulna awls 180
Unfinished pipes 256
Ungrooved axes 235
Union County 332
Ungulates 41
Utes 304

V.

Valleau, W. D. 321
Venereal diseases 131
Village sites 120

W.

Walum Olum 305
Wampum 280
Wapiti 42
Warren County 332
War clubs 240
Water bottles 277
Wayne County 332
Weir, S. G. 317
Wells, E. D. 328
Welsh Indians 172
Welsh Tradition 49
Western River Culture 68
Whetstones 297
White Indians 175
White Indian Tradition 50
White Lick Creek 317
Whitley County 333
Wild life 300
Wild pigeons 302
Wild turkey 302
Williams, I. R. 229
Wilson, Alexander 303
Wilson, John B. 281
Winnebago 304
Winters, Joe 155
Wolf jaws 114
Woodford County 333
Woodring, H. B. 150
Working flint 207, 209

Y.

Page

Yarnellton 42
Yates Cliff 181
Yates, Hugh 151, 178
Yates, W. S. 73
Young, Bennett H. 71, 188, 253, 295, 314
Yuma 305

Z.

Zoomorphic pipes 251, 255, 256
Zoomorphic pottery 270, 283